SERVICE MANUAL

Errata
man146rb-e1

V-CUE™ Dynamic Air Therapy® Unit

From Hill-Rom

Product No. P540A

For Parts or Technical Assistance
USA (800) 445-3720 Canada (800) 267-2337
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V-CUE™
Dynamic Air Therapy® Unit
Service Manual

Revisions

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Chapter 1 Introduction

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Purpose

This manual provides requirements for the V-CUE™ Dynamic Air Therapy® Unit normal operation and maintenance. It also includes a parts list (in chapter 5) for ordering replacement components.

Audience

This manual is intended for use by only facility-authorized personnel. Failure to observe this restriction can result in severe injury to people and serious damage to equipment.

Organization

This manual contains seven chapters.

Chapter 1: Introduction

In addition to a brief description of this service manual, chapter 1 also provides a product overview.

Chapter 2: Troubleshooting Procedures

Repair analysis procedures are contained in this chapter. Use these procedures to gather information, identify the maintenance need, and verify the effectiveness of the repair.

Chapter 3: Theory of Operation

This chapter describes the application of the mechanical, electrical, and hydraulic systems employed in this product.

Chapter 4: Removal, Replacement, and Adjustment Procedures

Chapter 4 contains the detailed maintenance procedures determined necessary in chapter 2.

Chapter 5: Parts List

This chapter contains the warranty, part-ordering procedure, and illustrated parts lists.

Chapter 6: General Procedures

Cleaning, preventive maintenance, and other general procedures are described in this chapter.

Chapter 7: Accessories

There are no accessories for the V-CUE™ Dynamic Air Therapy® Unit.

Typographical Conventions

This manual contains different typefaces and icons designed to improve readability and increase understanding of its content. Note the following examples:

- Standard text—used for regular information.
- **Boldface text**—emphasizes a word or phrase.
- **NOTE:**—sets apart special information or important instruction clarification.
- The symbol below highlights a WARNING or CAUTION:

Figure 1-1. Warning and Caution

  - A WARNING identifies situations or actions that may affect patient or user safety. Disregarding a warning could result in patient or user injury.
  - A CAUTION points out special procedures or precautions that personnel must follow to avoid equipment damage.
- The symbol below highlights a CAUGHT HAZARD WARNING:

Figure 1-2. Caught Hazard Warning

- The symbol below highlights a CHEMICAL HAZARD WARNING:

Figure 1-3. Chemical Hazard Warning

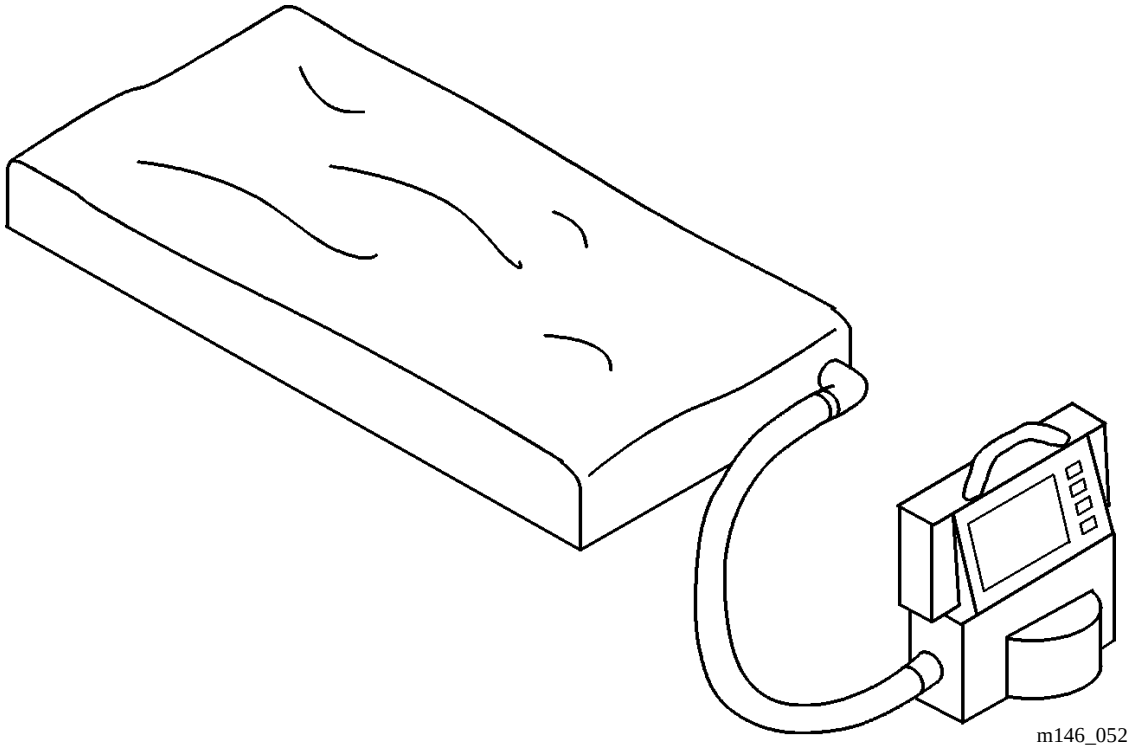
- The symbol below highlights an ELECTRICAL SHOCK HAZARD WARNING:

Figure 1-4. Electrical Shock Hazard Warning

Introduction

Overview

Figure 1-5. V-CUE™ Dynamic Air Therapy® Unit



The V-CUE™ Dynamic Air Therapy® Unit is a mattress replacement system incorporating the same features and benefits of the EFICA CC® Dynamic Air Therapy® Unit.

Since the development of CLINITRON® Air Fluidized Therapy Unit in the 1960s, Hill-Rom has been producing products that aid in the prevention and treatment of pressure ulcers. Today, with improvements in technology and changes in the way healthcare is delivered, Hill-Rom is designing products to continuously meet the changing needs of the healthcare industry.

Controlled by a system of microprocessors, the V-CUE™ Dynamic Air Therapy® Unit incorporates a unique mattress design providing rotation, OPTI•REST Mode, vibration, percussion, and low airloss therapy. This creates the ideal support for preventing or treating pulmonary complications of immobile patients.

The mattress of the V-CUE™ Dynamic Air Therapy® Unit consists of two tiers of cushions. The lower tier, or working cushions, contains three independent inflation bladders and two boost bladders. The upper tier, or sleep surface, consists of five sections acting together to form the sleep surface. There is a head cushion, chest cushion, seat/thigh cushion, foot cushions, and cradle cushion. The computer-controlled valves allow air to fill the cushions according to the patient's individual height and weight. Airflow is distributed through the cushions to achieve the lowest skin contact pressures and provide optimal patient comfort. The rotation mode provides gentle bilateral rotation, and the OPTI•REST Mode provides a gentle massaging action. The vibration and percussion modes are used as a part of Chest Physical Therapy (CPT) to loosen mucus and help move secretions from the patient's chest.

A menu-driven, interactive, touch screen is located in the air supply unit. It operates therapeutic functions, such as rotation and OPTI•REST Mode. Help screens provide additional information and describe control panel functions.

Operating Precautions

For operating precautions for the V-CUE™ Dynamic Air Therapy® Unit, refer to the *V-CUE™ Dynamic Air Therapy® Unit User Manual*.

Features

The V-CUE™ Dynamic Air Therapy® Unit provides the following standard features:

Therapy Overrides

Overrides have been built into the unit for cushion pressure adjustments and siderail down sensors when using the unit on bed frames from Hill-Rom.

Comfort Control

There are five zones in the V-CUE™ Dynamic Air Therapy® Unit. Zones one through four are patient support zones, and zone five is for the COMFORTGUARD® Cushions.

Cushion Pressure

The cushion pressures are determined by pre-programmed software. Pressure transducers provide feedback that controls the valves and blower speed.

Menus

There are a variety of menu options and displays available that provide the caregiver with pertinent information. They are explained in detail throughout this manual.

Specifications

Physical Description

For V-CUE™ Dynamic Air Therapy® Unit physical specifications, see table 1-1 on page 1-8.

Table 1-1. Physical Specifications

Feature	Dimension
Air supply unit depth	7.3" (18.5 cm)
Air supply unit width	17" (43 cm)
Air supply unit height	16.5" (41.9 cm)
Air supply unit weight	23 lb (10 kg)
Sleep surface length	80" (203 cm)
Mattress width (ICU)	32" (81 cm)
Mattress width (Med/Surg)	35" (89 cm)
Mattress height	8" (20 cm)
Mattress weight	50 lb (23 kg)
Maximum patient weight	400 lb (181 kg)
Sound level	55 dBa (maximum)

Electrical Description

For V-CUE™ Dynamic Air Therapy® Unit electrical specifications, see table 1-2 on page 1-9.

Table 1-2. Electrical Specifications

Feature	Dimension
120V model	120V AC (± 10%), 60Hz (± 1 Hz), meets UL Specification 2601-1 and CSA®[a] C22.2
230V model	230V AC (± 10%), 50 Hz (± 1 Hz), meets International Electrotechnical Commission (IEC) 60601-1

a. CSA® is a registered trademark of Canadian Standards Association.

Regulations, Standards, and Codes

Product classification per UL 2601 and IEC 60601-1, Class I, Type B, and meets the applicable provisions of Directive 93/42/European Economic Community (EEC).

NOTE:
This product has been tested and found to be in compliance with IEC/European Standard (EN) 60601-1-2 for electromagnetic compatibility.

The symbol below highlights a Type B insulation applied part according to the degree of protection:

Figure 1-6. Type B Insulation Applied Part

The term “IPX0” indicates “ordinary equipment (enclosed equipment without protection against ingress of water).”

Environmental Conditions

For V-CUE™ Dynamic Air Therapy® Unit environmental conditions, see table 1-3 on page 1-10.

Table 1-3. Environmental Conditions

Operating Condition	Temperature Range
Ambient operation	68°F (20°C) to 99°F (37°C)
Storage	-40°F (-4°C) to 158°F (70°C)
Relative humidity range, including condensation	30% to 75% during operation 10% to 100% during storage
Atmospheric pressure range	7 psi to 15 psi (50 kPa to 106 kPa)

Model Identification

For V-CUE™ Dynamic Air Therapy® Unit model identification, see table 1-4 on page 1-10.

Table 1-4. Model Identification

Model Number	Description
P540A60	V-CUE™ Dynamic Air Therapy® Unit (120V, 60 Hz)
P540A77	V-CUE™ Dynamic Air Therapy® Unit (120V, 60 Hz) (International)
P540A83	V-CUE™ Dynamic Air Therapy® Unit (230V, 50 Hz) (Australian)
P540A84	V-CUE™ Dynamic Air Therapy® Unit (230V, 50 Hz) (International)

Safety Tips

WARNING:
Only facility-authorized personnel should troubleshoot the V-CUE™ Dynamic Air Therapy® Unit. Troubleshooting by unauthorized personnel could result in personal injury or equipment damage.

WARNING:
Never attempt any maintenance function that is not specifically called for in the service procedures. Attempting functions not in service procedures could result in personal injury or equipment damage.

WARNING:
Follow the product manufacturer's instructions. Failure to do so could result in personal injury or equipment damage.

WARNING:
Adhere to the *Infection Control Policies and Procedures* from Hill-Rom. Failure to do so could result in the spread of infection.

WARNING:
The siderail position sensors and head of bed sensor contain glass-encapsulated mercury. Dispose of these sensors in accordance with local environmental regulations. Ensure the sensors are serviced or replaced only by properly trained service technicians. Failure to do so could release the encapsulated material. In case of a release, adhere to the proper, mercury, clean-up procedure as specified by the local regulating authority.

WARNING:
Dispose of the battery in accordance with the proper disposal procedure as specified by the local environmental regulations. Failure to do so could result in personal injury.

WARNING:
Enter the patient's height and weight on the SETUP UNIT FOR PATIENT screen to ensure proper therapeutic pressure in each zone. Failure to enter the proper parameters could result in patient injury.

SHOCK HAZARD:
If any of the voltage measurements are not as specified, the cause must be corrected. Do not plug the unit into any power source. A licensed electrician must correct the wiring. Do not attempt to correct the wiring yourself. Attempting to do so could result in personal injury.

SHOCK HAZARD:
High voltage may exist at the power source. Ensure that you are using the correct voltage meter for the power source, and handle the leads only by their insulated ends. Failure to do so could result in severe burns or death.

SHOCK HAZARD:
Voltage is present on exposed electrical connectors when power is on. Use care when working close to exposed connections. Failure to do so could result in personal injury or equipment damage.

SHOCK HAZARD:
Unplug the unit from its power source. Failure to do so could result in personal injury or equipment damage.

SHOCK HAZARD:
Avoid touching the power supply, P.C. board, heat sink. When power is applied to the unit, contact with the power supply, P.C. board, heat sink could result in severe injury or death.

SHOCK HAZARD:
Do not expose the unit to excessive moisture. Personal injury or equipment damage could occur.

CAUTION:
Ensure the leads from the battery and the battery charger P.C. board are properly connected and routed. Failure to do so could result in equipment damage.

CAUTION:
When handling electronic components, wear an antistatic strap. Failure to do so could result in component damage.

CAUTION:
Do not touch the EPROM pins. The pins can be damaged or misaligned jeopardizing the connection.

CAUTION:
Ensure that all of the EPROM pins are securely in the sockets and that the notch faces the bottom end of the LCD screen's P.C. board. Failure to do so could result in equipment damage.

CAUTION:
Do not use harsh cleansers, solvents, or detergents. Equipment damage could occur.

CAUTION:
Do not wash the mattress assembly in a washing machine. Washing the entire assembly will damage internal components.

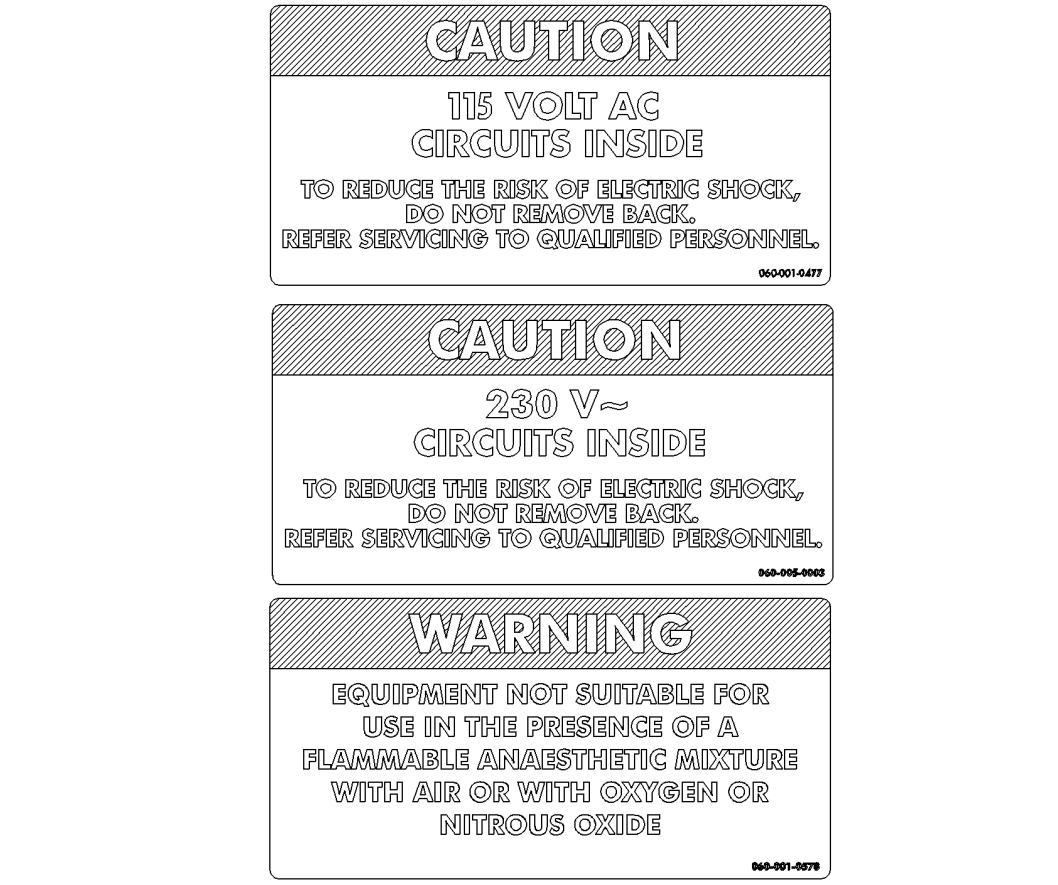
CAUTION:
To prevent component damage, ensure that your hands are clean, and **only** handle the P.C. board by its edges.

CAUTION:
For shipping and storage, place the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

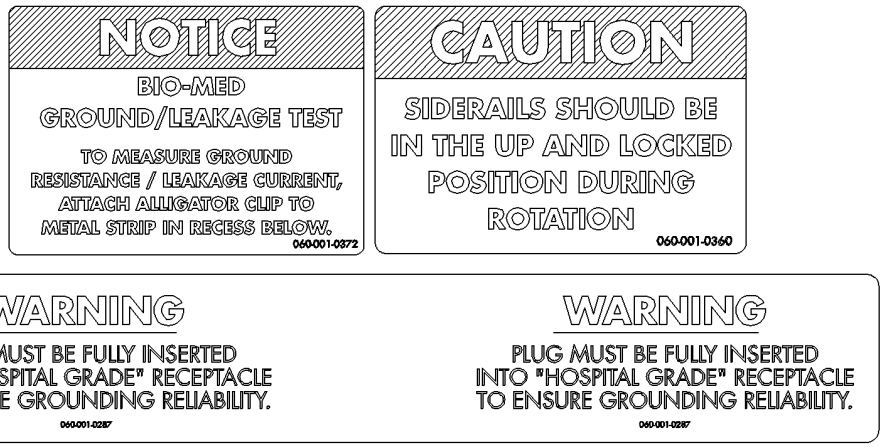
CAUTION:
Turn the percussion/vibration elbow inward and parallel with the foot plate when tri-folding the mattress for transport. Failure to do so could result in equipment damage.

Warning and Caution Labels

Figure 1-7. Warning and Caution Labels



Note:
This symbol indicates: "Attention, consult accompanying documents."



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Chapter 2
Troubleshooting Procedures

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Getting Started

WARNING:
Only facility-authorized personnel should troubleshoot the V-CUE™ Dynamic Air Therapy® Unit. Troubleshooting by unauthorized personnel could result in personal injury or equipment damage.

Begin each procedure in this chapter with step 1. Follow the sequence outlined (each step assumes the previous step has been completed). In each step, the normal operation of the product can be confirmed by answering **Yes** or **No** to the statement. Your response will lead to another step in the procedure, a repair analysis procedure (RAP), or a component replacement. If more than one component is listed, replace them in the given order.

To begin gathering information about the problem, start with **Initial Actions**.

To isolate or identify a problem and to verify the repair after completing each corrective action (replacing or adjusting a part, seating a connector, etc.), perform the **Function Checks**.

To verify the repair, perform the **Final Actions** after the Function Checks.

If troubleshooting procedures do not isolate the problem, call Hill-Rom Technical Support at (800) 445-3720 for assistance.

NOTE:
Some fuses internal to the control panel assembly and the power supply assembly are not serviceable. For further instruction, contact your Hill-Rom Service Representative or local distributor.

Initial Actions

To gather information from operators concerning problems with the V-CUE™ Dynamic Air Therapy® Unit, use Initial Actions. Note symptoms or other information concerning the problem that the operator describes. This information helps identify the probable cause.

1. Someone who can explain the problem is available.

   Yes **No**
   ↓ → Go to “Function Checks” on page 2-4.

2. Ask that person to demonstrate or explain the problem. The problem can be duplicated.

   Yes **No**
   ↓ → Go to "Function Checks" on page 2-4.

3. The problem is a result of improper operator action.

   Yes **No**
   ↓ → Go to "Function Checks" on page 2-4.

4. Instruct the operator to refer to the procedures in the *V-CUE™ Dynamic Air Therapy® Unit User Manual*. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the "Function Checks" on page 2-4.

Function Checks

NOTE:
Perform these procedures with no patient on the mattress. There may be steps that cannot be performed with a patient on the unit.

1. Initial Actions have been performed.

   Yes **No**
   ↓ → Go to "Initial Actions" on page 2-3.

2. Ensure that the power cord is firmly connected to the air supply unit and an appropriate power supply. Ensure that the air supply hose and the data extension cord are connected firmly to the air supply unit.The green indicator light on the side of the air supply unit is illuminated.

   Yes **No**
   ↓ → Go to RAP 2.1.

NOTE:
Do not press any of the control buttons beside the display screen on the air supply unit until you hear three beeps. When you first plug the power cord into an appropriate power source and the air supply unit, the on-board diagnostics perform a power-up procedure. This could take a couple of minutes. Other than the power-up message, the display screen remains blank until the process is complete. When the process is complete, the air supply unit sounds three beeps. If you press any control button before the power-up procedure is complete, the air supply unit may lock up and appear to be non-functional.

3. One or two minutes after the unit is first connected to an appropriate power source, the unit sounds three beeps.

   Yes **No**
   ↓ → Go to RAP 2.1.

4. The green LED above the Therapy On/Off button is illuminated.

   Yes **No**
   ↓ → Press the Therapy On/Off button. If the green LED is still not illuminated, go to RAP 2.1.

5. Check for air leaks caused by the following problems:

   - A loose air supply hose at the air supply unit or mattress inlet at the foot left
   - A loose air supply cable connection at the air supply unit or mattress inlet at the foot left

   a. If air is not leaking in those areas, wait until all mattress segments fully inflate before proceeding to check for air leaks in less obvious places.

   b. Spray a soapy water solution to help you detect air leaks around the following connections:

   - An air leak on either side of the ICU/Med/Surg switch plate at the foot left
   - Air leaks at the valve manifold's foot left, head left, and head right
   - Air leaks or disconnected air feed tubes at the valve manifolds
   - Air leaks at the cushion supply and vent hose connections
   - Holes or tears in any of the cushions

   This solves the problem.

   Yes **No**
   ↓ → Go to step 7.

6. Go to "Final Actions" on page 2-10.

7. You can see the display on the air supply unit screen.

   Yes **No**
   ↓ → Sunlight or bright ambient lighting can affect the visibility of the display screen. If the display does not appear or is too light to read comfortably, try shading the screen from sunlight or room lights, and ensure proper contrast setting from the main menu. If this solves the problems, go to "Final Actions" on page 2-10. Otherwise, go to RAP 2.3.

NOTE:
If the display screen shows CPR, touch the PRESS TO RETURN TO STANDARD MODE section of the screen twice to exit CPR mode. If the display screen shows TRANSPORT MODE, touch the CANCEL TRANSPORT MODE section of the screen.

8. The display screen is showing an error code or message.

   Yes **No**
   ↓ → Go to step 9.

NOTE:
Authorized service personnel should find a listing of all error codes, their probable causes, and suggested solutions in the on-board database. To access the database, perform the following:

a. Touch MENU on the display screen.
b. Touch MENU on the new display.
c. Touch the second, fourth, third, first, and fifth boxes in sequence to access the service options menu.
d. Touch History on the Service Options Menu.
e. Touch the ? symbol in the upper right corner of the history listing.
f. Use the arrows, NEXT PAGE, and PREV SCREEN selectors to find and highlight the error code you need.
g. Touch DETAIL INFO to get a screen that lists the error description, probable causes, and possible solutions.
h. Refer to table 2-1 on page 2-7, and perform the action listed in the solution column for the appropriate code.
i. Touch EXIT HELP when you are done with the Help menu.
j. Touch SERVICE MENU to return to the service options menu, or touch MENU to go to the menu selection screen.

Table 2-1. Error Code/Solution

Error Code or Message	Solution
LOW BATTERY CALL FOR SERVICE	Go to RAP 2.10.
101 through 206	Check the History help screen menu (“?”) for details on the error code meaning, a list of probable causes, and suggestions for the solutions.
208	Verify the current date on the Set Clock menu under the Unit Settings option of the Service Options Menu.
300 or 315	Check all data cable connections between the control panel and the head right proportional valve assembly. If all connections are sound, check for continuity in the cables. If all cables have continuity, go to RAP 2.2.
313	The mattress has an obsolete version of the program. Unplug the air supply unit from its power source, wait 30 seconds, and then plug the air supply unit into an appropriate power source. The onboard diagnostics performs a self-test, and reprograms the proportional valve assembly.
700	Check the parameter settings on the printer or computer connected to the external port to see that they match those listed in the “History” help screen for code 700. If the parameters are correct, replace the cable that connects the control panel to the printer or computer.
800	Go to RAP 2.4.
801 through 812	Check for air leaks where hoses connect to the cushion with the problem. Check for air leaks at the feed tubes. If no air leaks are found, go to RAP 2.5.
901 through 912	Go to RAP 2.5.
SIDERAIL SENSORS	Check the connections between the siderail sensors and the interface inside the mattress encasement. Check the mounting of the sensor on the siderail. Raise the siderails, and confirm that the message is no longer displayed.

9. The blower is on.

   Yes **No**
   ↓ → Go to RAP 2.4.

10. All air mattress sections inflate properly within 5 minutes after the Therapy On/Off button is pressed.

    Yes **No**
    ↓ → Go to RAP 2.5.

11. Unplug the unit from its power source.

    All cushions remain inflated.

    Yes **No**
    ↓ → Go to RAP 2.5.

12. Plug the unit into an appropriate power source, and press the Max Inflate button.

    The cushions fully inflate.

    Yes **No**
    ↓ → Go to RAP 2.6.

13. Press the CPR button.

    All cushions fully deflate.

    Yes **No**
    ↓ → Go to RAP 2.7.

14. **Authorized personnel only:** Perform an automatic Function Test using the built-in diagnostics.

    a. On the Main Menu, press the touch areas at the bottom of the screen in the following sequence: second box, fourth box, third box, first box, and fifth box.

    b. On the Service Options Menu, touch Diagnostics.

    c. On the Diagnostics Menu, touch Function Test.

    d. On the Functional Test screen, touch Start Test.

    e. Monitor the sleep surface with both your hands and eyes throughout the test, waiting for a visual and tactile result (see table 2-2 on page 2-9):

Table 2-2. Functional Test Observations

Test No.	Tactile Result	Visual Result	Solution
Percussion/ Vibration (P/V)	Slow or no pulsing in the cushions	Not applicable	Check the hose routing and connections (refer to RAP 2.5). Check the cushions. If the connections and cushions are sound, replace the P/V valve (refer to procedure 4.15).
Rotation—Chest Cradle Section	No or slow pulsing in the cushions	The cradle section of the chest cushion rises.	Check the hose routing and connections (refer to RAP 2.5). Check the cushions. If connections and cushions are sound, go to RAP 2.8.
Rotation—Patient Right Chest	No or slow pulsing in the cushions	The patient-right side of chest cushion rises.	Check the hose routing and connections (refer to RAP 2.5). Check the cushions. If the connections and cushions are sound, go to RAP 2.8.
Rotation—Patient Left Chest	No or slow pulsing in the cushions	The patient-left side of chest cushion rises.	Check the hose routing and connections (refer to RAP 2.5). Check the cushions. If the connections and cushions are sound, go to RAP 2.8.
OPTI•REST Mode	Cradle cushions inflate and deflate sequentially to produce a rocking motion.	Not applicable	Check hose routing and connections (refer to RAP 2.5). Check cushions. If connections and cushions are sound, go to RAP 2.9.

All portions of the test complete successfully.

Yes **No**
↓ → Refer to table 2-2 on page 2-9, and perform the action(s) listed in the Solution column.

15. On the Main Menu of the power unit display screen, touch Therapy Selection. On the Therapy Mode/Settings screen, touch Rotation.

    Rotation mode is functioning properly.

    Yes **No**
    ↓ → Go to RAP 2.8.

16. On the Main Menu screen, touch Turn Assist.

Turn Assist mode is functioning properly.

Yes **No**
↓ → Go to RAP 2.8.

17. On the Main Menu screen, touch Transfer.

    The Transfer function operates properly.

    Yes **No**
    ↓ → Go to RAP 2.5.

18. On the Main Menu screen, touch Transport.

    The Transport function operates properly.

    Yes **No**
    ↓ → Go to RAP 2.5.

19. Go to "Final Actions" on page 2-10.

NOTE:
If your problem is not listed, call Technical Support at (800) 445-3720 for assistance.

Final Actions

1. Complete the required interval maintenance procedures. See "Pre-Installation Maintenance (PIM)" on page 6-7 and "Routine Maintenance" on page 6-8.
2. Ensure all covers/panels are in place and secure.
3. Notify the caregiver that work has been completed on the therapy unit.
4. Complete all required administrative tasks.

2.1 AC Voltage Malfunction

WARNING:
Never attempt any maintenance function that is not specifically called for in the service procedures. Attempting functions not in service procedures could result in personal injury or equipment damage.

1. The power cord is properly plugged into an appropriate power source.

   Yes ↓ **No** → Plug the unit into an appropriate power source.

SHOCK HAZARD:
If any of the voltage measurements are not as specified, the cause must be corrected. Do not plug the unit into any power source. A licensed electrician must correct the wiring. Do not attempt to correct the wiring yourself. Attempting to do so could result in personal injury.

SHOCK HAZARD:
High voltage may exist at the power source. Ensure that you are using the correct voltage meter for the power source, and handle the leads only by their insulated ends. Failure to do so could result in severe burns or death.

2. Unplug the power cord from its power source and the air supply unit, and use an outlet tester to check the voltage at the power source. Ensure that you are using the correct voltage meter for the power source.

   The voltage is correct.

   Yes ↓ **No** → Inform the customer of the problem with power at the outlet.

3. Inspect the wires in the power cord plug for loose connections, and check the cord for cuts/damage.

   The power cord and plug connections are in good condition.

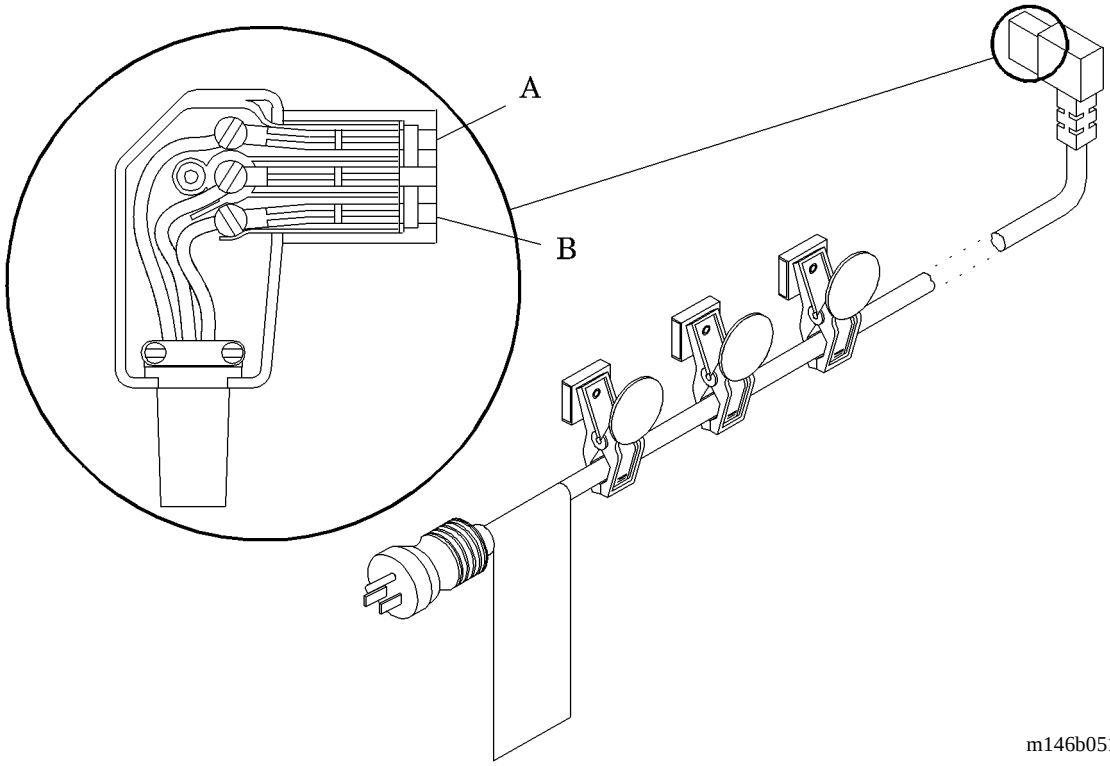
   Yes ↓ **No** → Replace the power cord. If this solves the problem, go to “Final Actions” on page 2-10. Otherwise, go to step 4.

4. Perform the following:
   a. Plug the unit into an appropriate power source.
   b. Set the meter to the AC scale.

SHOCK HAZARD:
Voltage is present on exposed electrical connectors when power is on. Use care when working close to exposed connections. Failure to do so could result in personal injury or equipment damage.

   c. Disconnect the end of the power cord that is normally attached to the air supply unit, and measure the voltage across the AC line (A) and AC neutral (B) pins (see figure 2-1 on page 2-12).

Figure 2-1. Power Cord Test Points



120V model only: The voltage measures 120V AC.

Yes ↓

No → Replace the power cord. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 5.

230V model only: The voltage measures 230V AC.

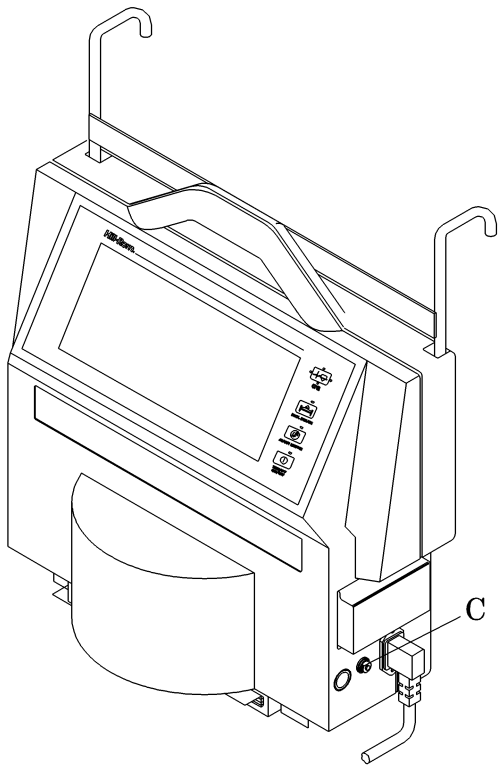
Yes **No**
↓ → Replace the power cord. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 5.

5. Check for a tripped circuit breaker (C) on the side of the unit (see figure 2-2 on page 2-13).

   The circuit breaker is set (not tripped).

   Yes **No**
   ↓ → Reset the circuit breaker. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 6.

Figure 2-2. Circuit Breaker Switch Location



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6. Perform the following:
   a. Place the air supply unit on a work surface.
   b. Remove the five air supply unit case screws on the rear of the case, and then separate the front and rear sections (refer to procedure 4.1).

SHOCK HAZARD:
Voltage is present on exposed electrical connectors when power is on. Use care when working close to exposed connections. Failure to do so could result in personal injury or equipment damage.

c. Plug the power cord into the air supply unit.

d. Measure the voltage from the blue wire (D) to the tan wire (E) connections on the back of the power cord receptacle (see figure 2-3 on page 2-14).

120V model only: The voltage measures 120V AC.

Yes ↓

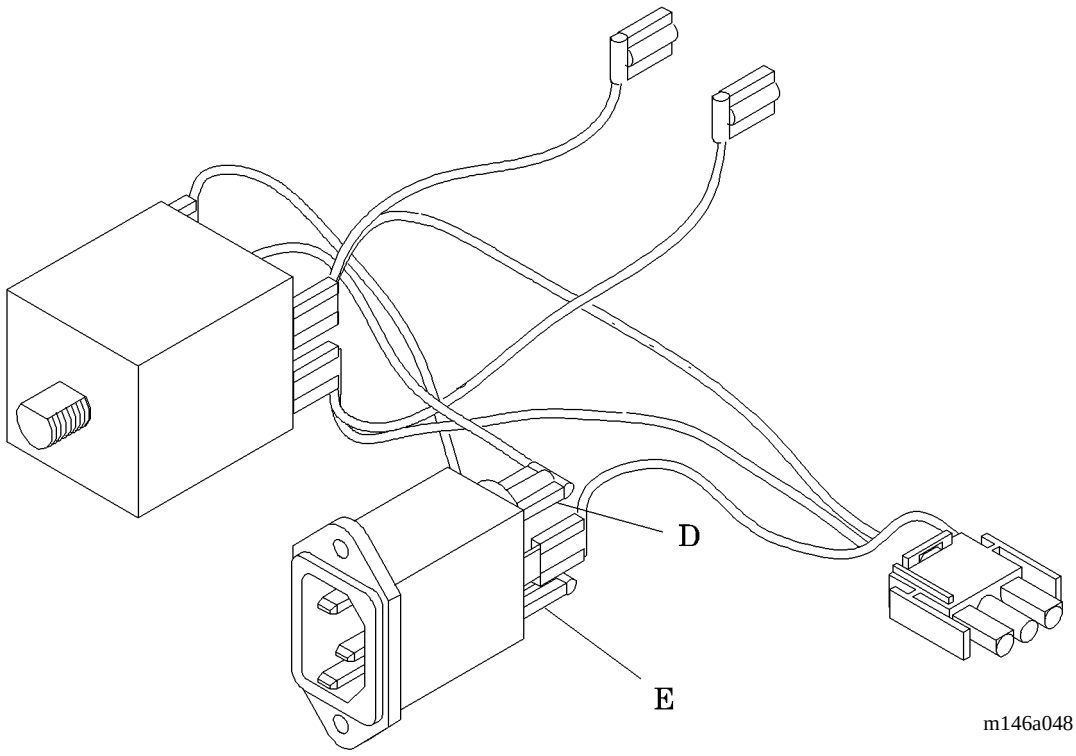
No → Replace the power cord receptacle (refer to procedure 4.6). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 7.

230V model only: The voltage measures 230V AC.

Yes ↓

No → Replace the power cord receptacle (refer to procedure 4.6). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 7.

Figure 2-3. Power Cord Receptacle Connections



7. Check for damaged or loose wiring between the power cord receptacle and the power supply P.C. board. The wiring is all right.

   Yes **No**
   ↓ → Fix or replace the wiring. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 8.

8. Replace the power supply board (refer to procedure 4.18). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

2.2 DC Voltage Malfunction

1. The green indicator light on the side of the air supply unit is on.

   Yes **No**
   ↓ → Go to RAP 2.1.

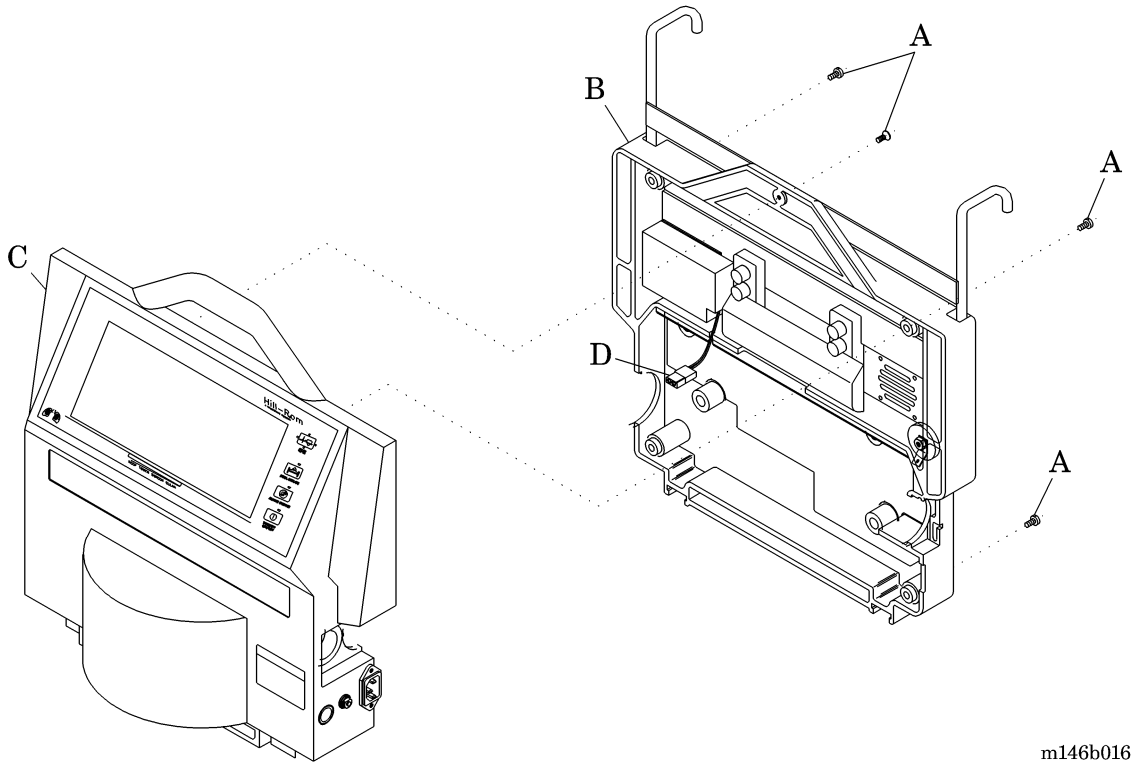
2. Perform the following:

SHOCK HAZARD:
Unplug the unit from its power source. Failure to do so could result in personal injury or equipment damage.

   a. Unplug the unit from the power source, and remove the air supply hose (if attached).

   b. Using a phillips head screwdriver, remove the five screws (A) that secure the rear case (B) to the front case (C) (see figure 2-4 on page 2-16).

Figure 2-4. Air Supply Unit Case



   c. Carefully pull the rear case (B) from the front case (C).

NOTE:
All DC voltages (except back-up battery voltage) are generated on the power supply P.C. board. If AC voltage is good and no unit functions are available, the most likely cause of the problem is a loose connection or a damaged power supply P.C. board.

SHOCK HAZARD:
Avoid touching the power supply, P.C. board, heat sink. When power is applied to the unit, contact with the power supply, P.C. board, heat sink could result in severe injury or death.

d. Avoid touching the power supply, P.C board, heat sink, and check the following connections:

- Between the power cord receptacle and the power supply P.C. board
- Between the power supply P.C. board and the control panel

The connections are good.

Yes ↓ **No** → Connect the terminals securely, use a phillips head screwdriver to install the five screws (A) that secure the rear case (B) to the front case (C), ensure that the mattress is securely connected to the air supply unit, and test the unit. If the problem is solved, go to "Final Actions" on page 2-10. Otherwise, go to step 3.

3. Look at the LEDs on the percussion/vibration (P/V) assembly P.C. board inside the mattress at the patient foot left:

The red LED is on.

Yes ↓ **No** → Perform the following actions, and test the unit after each replacement:

a. Replace the air hose. If the problem is solved, go to "Final Actions" on page 2-10. Otherwise, replace the next component.

b. Replace the control panel extension cable between the air supply unit and the ICU/Med/Surg exterior plate at the mattress foot left. If the problem is solved, go to "Final Actions" on page 2-10. Otherwise, replace the next component.

c. Replace the extension cable between the ICU/Med/Surg interior plate and the P/V assembly. If the problem is solved, go to "Final Actions" on page 2-10. Otherwise, replace the next component.

d. Replace the power supply (refer to procedure 4.18). If the problem is solved, go to "Final Actions" on page 2-10. Otherwise, go to step 5.

4. Look at the LEDs on the percussion/vibration (P/V) assembly P.C. board. The green LED is on.

   Yes **No**

   ↓ → Disconnect the cable from the P/V assembly to the head end valve P.C. boards. If the green light comes on, go to RAP 2.5. If the green light remains unlit, replace the P/V assembly (refer to procedure 4.15). If the problem is solved, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720.

5. Call Hill-Rom Technical Support at (800) 445-3720 for assistance.

2.3 Control Panel Malfunction

NOTE:
The control panel assembly is a touch screen and control P.C. board that can be replaced in the field. The control buttons cannot be replaced in the field.

1. The air supply unit is on, and the mattress is inflated, but the touch screen is dark, does not appear, or it too light to read.

   Yes **No**
   ↓ → No air supply function works. Go to step 3.

2. Access the Main Menu, and adjust the screen contrast.

   This solves the problem.

   Yes **No**
   ↓ → Sunlight or bright ambient lighting can affect the visibility of the display screen. Shade the screen from sunlight or room lights. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 6.

NOTE:
If you press a function button before the power-up procedure is complete, the air supply unit may lock up and appear to be non-functional.

3. Perform the following:
   a. Unplug the power cord from the air supply unit.
   b. Wait 30 seconds.
   c. Plug the power cord into the air supply unit, but **do not touch** any function button until the air supply unit sounds three beeps.
   d. Wait until the air supply unit beeps three times.
   e. Press the Therapy On/Off button.

   The touch screen display comes on.

   Yes **No**
   ↓ → Go to step 6.

4. Press the Max. Inflate button.

   The blower comes on, and all cushions inflate to maximum pressure.

   Yes **No**
   ↓ → Go to RAP 2.6.

5. Press the CPR button.

The blower stops, and all cushions immediately deflate.

Yes **No**
↓ → Go to RAP 2.7.

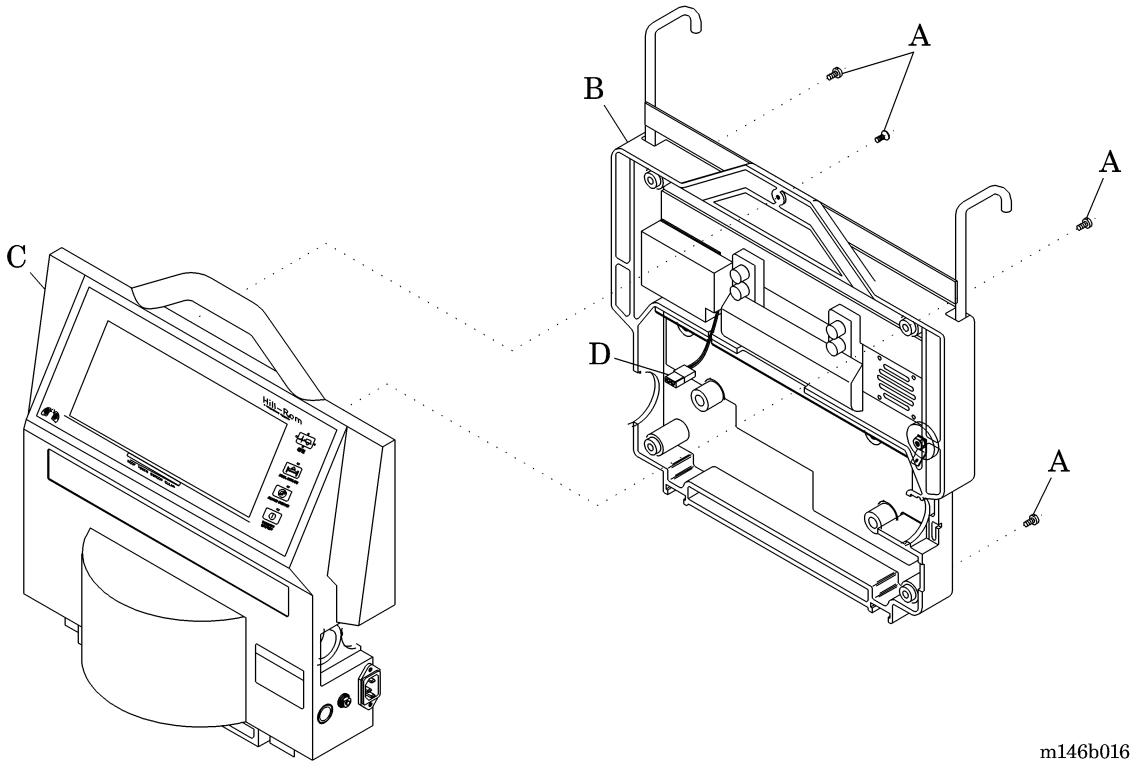
6. Perform the following:

SHOCK HAZARD:
Unplug the unit from its power source. Failure to do so could result in personal injury or equipment damage.

a. Unplug the unit from the power source, and remove the air supply hose (if attached).

b. Using a phillips head screwdriver, remove the five screws (A) that secure the rear case (B) to the front case (C) (see figure 2-5 on page 2-20).

Figure 2-5. Air Supply Unit Case



c. Carefully pull the rear case (B) from the front case (C).

SHOCK HAZARD:
Avoid touching the power supply, P.C. board, heat sink. When power is applied to the unit, contact with the power supply, P.C. board, heat sink could result in severe injury or death.

d. Avoid touching the power supply heat sink, and check for a loose connector on the power supply P.C. board and the rear of the control panel.

All connections are good.

Yes **No**
↓ → Repair the connections as necessary. If the problem is solved, go to "Final Actions" on page 2-10. Otherwise, go to step 7.

7. Replace the control panel assembly (refer to procedure 4.8).

This solves the problem.

Yes **No**
↓ → Call Hill-Rom Technical Support at (800) 445-3720 for assistance.

8. Go to "Final Actions" on page 2-10.

2.4 Blower Malfunction

1. The blower is connected to the mattress.

   Yes **No**
   ↓ → Connect the blower to the mattress. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 2.

2. The blower runs when the Therapy On/Off button is pressed.

   Yes **No**
   ↓ → Go to step 7.

3. Check the connections of the air feed tubes to the following control valve assemblies inside the mattress:

   - Two at the P/V valve at the patient foot left
   - One at the proportional valve set at patient head left
   - One at the proportional valve set at patient head right

   All air feed tubes are firmly connected to their control valve assemblies.

   Yes **No**
   ↓ → Connect the air feed tube to the P/V or proportional valve assembly. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 4.

4. Press the CPR button, and then touch PRESS TO RETURN TO STANDARD MODE on the touch screen twice.

   The blower comes on.

   Yes **No**
   ↓ → Go to step 7.

5. The mattress inflates properly.

   Yes **No**
   ↓ → Go to RAP 2.5.

6. Go to "Final Actions" on page 2-10.

7. Perform the following to access the History screen:

   a. Touch MENU on the display screen.

   b. Touch MENU on the new display.

   c. Touch the second, fourth, third, first, and fifth boxes in sequence to access the Service Options Menu.

   d. Touch History on the Service Options Menu.

e. Touch the ? symbol in the upper right corner of the history listing.

f. Use the arrows, NEXT PAGE, and PREV SCREEN to review the error codes.

Error code 109 appears in the To/STATUS column.

Yes **No**
↓ → Go to step 11.

8. The blower is overheating. Check for obstructions at the inlet filter and outlet hoses.

   The filter and hoses are free of obstructions.

   Yes **No**
   ↓ → Clear the obstructions, and re-test the unit. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 9.

9. Replace the blower motor (refer to procedure 4.5).

   This solves the problem.

   Yes **No**
   ↓ → Call Hill-Rom Technical Service at (800) 445-3720 for assistance.

10. Go to "Final Actions" on page 2-10.

11. Perform the following:

    a. Connect the blower thermistor connector to J4 (A) on the battery charger P.C. board (B) (see figure 2-6 on page 2-24).

    b. Plug the power cord into the side of the air supply unit and into an appropriate power supply.

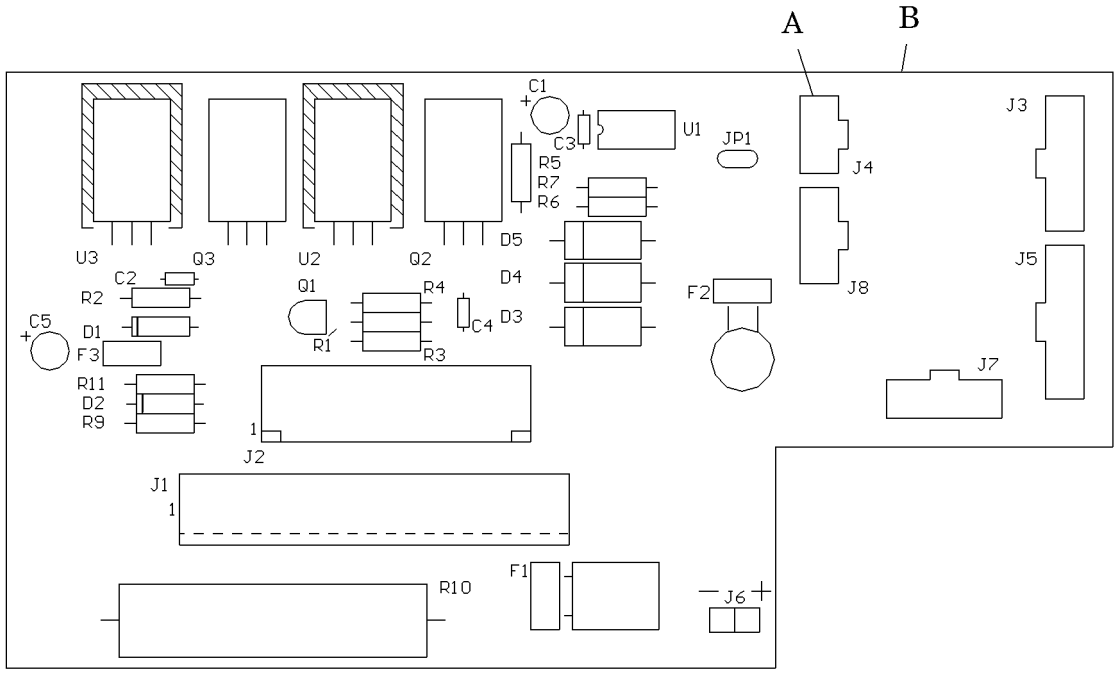
    c. Set the meter to the AC scale.

    d. Ensure that the Therapy On/Off button is on.

WARNING:
Voltage is present on exposed electrical connectors when power is on. Use care when working close to exposed connections. Failure to do so could result in personal injury or equipment damage.

    e. At the blower, carefully measure the voltage from J7-5 (brown wire) to J7-6 (blue wire).

Figure 2-6. Battery Charger P.C. Board



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120V model only: The voltage measures approximately 120V AC.

230V model only: The voltage measures approximately 230V AC.

Yes **No**
↓ → Go to step 16.

12. Perform the following:

    a. Set the meter to the DC scale.

    b. At the blower, carefully measure the voltage from J7-2 (red wire) to J7-1 (black wire).

    The voltage measures between 3V DC and 10V DC.

    Yes **No**
    ↓ → Replace the power supply P.C. board (refer to procedure 4.18). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 13.

13. The voltage from J7-2 (red wire) to J7-1 (black wire) measures between 3V DC and 10V DC.

Yes **No**
↓ → Replace the control panel (refer to procedure 4.8). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720 for assistance.

14. Replace the blower (refer to procedure 4.5).

    This solves the problem.

    Yes **No**
    ↓ → Call Hill-Rom Technical Support at (800) 445-3720 for assistance.

15. Go to "Final Actions" on page 2-10.

WARNING:
Voltage is present on exposed electrical connectors when power is on. Use care when working close to exposed connections. Failure to do so could result in personal injury or equipment damage.

16. Measure the voltage at the output terminals on the circuit breaker.

    120V model only: The voltage measures approximately 120V AC.

    230V model only: The voltage measures approximately 230V AC.

    Yes **No**
    ↓ → Replace the wiring between the circuit breaker and the blower (refer to procedure 4.7). If this solves the problem, go to "Final Actions" on page 2-10. If not, call Hill-Rom Technical Support at (800) 445-3720 for assistance.

17. Replace the circuit breaker assembly.

    This solves the problem.

    Yes **No**
    ↓ → Call Hill-Rom Technical Support at (800) 445-3720 for assistance.

18. Go to "Final Actions" on page 2-10.

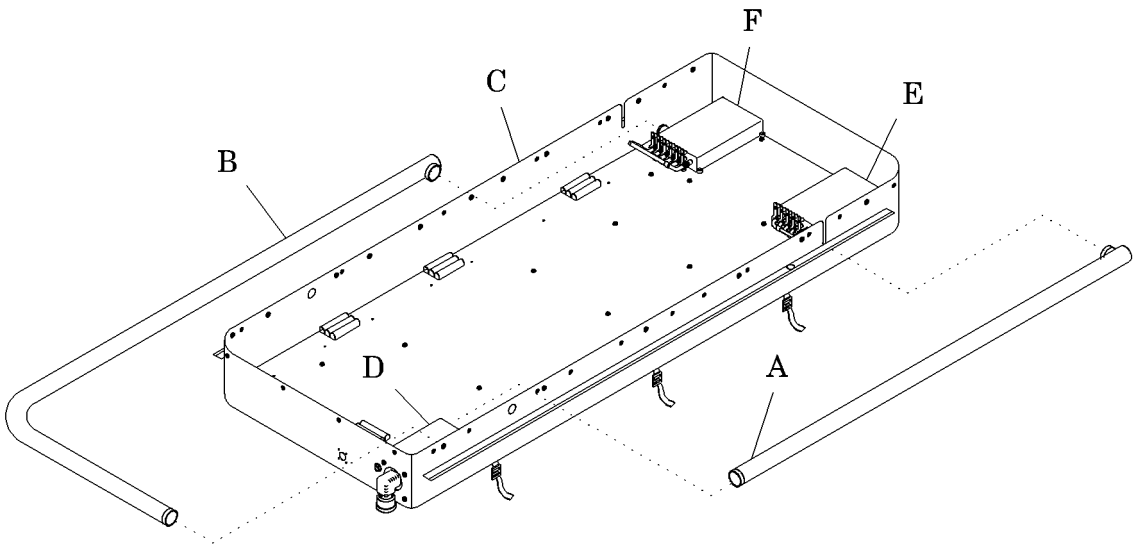
2.5 Cushion Inflation Malfunction

1. The air supply hose is properly connected at the air supply unit and the air mattress.

   Yes **No**
   ↓ → Connect the air supply hose. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 2.

2. Check the following connections of the straight air feed tube (A) and right angle tube (B) to the control valve assemblies inside the mattress (C) (see figure 2-7 on page 2-26):
   - Two at the P/V valve (D) at the patient foot left
   - One at the proportional valve set at patient head left (E)
   - One at the proportional valve set at patient head right (F)

Figure 2-7. Feed Tubes



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The straight feed tube (A) and right angle tube (B) are firmly connected to their control valve assemblies.

Yes **No**
↓ → Connect the straight feed tube (A) or right angle tube (B) to the control valve assembly. If the problem is solved, go to "Final Actions" on page 2-10. Otherwise, go to step 3.

3. Listen for an air leak on the mattress (C) in the area of the hoses, control valve assemblies, 3-way valve at the foot end, and individual cushions corresponding with the displayed error code.

   An air leak is detected.

   Yes **No**
   ↓ → Go to step 6.

4. Repair the leak by repairing the hose connection or replacing the leaking component.

   This solves the problem.

   Yes **No**
   ↓ → Go to step 8.

5. Go to "Final Actions" on page 2-10.

6. Ensure the affected cushion is properly inflated.

   a. Disconnect the hose from the affected cushion valve assembly (see table 2-3 on page 2-28).

   b. Completely plug the hose end to keep air from escaping.

Table 2-3. Cushion/Valve Relationship

Cushion	Valve Number	Valve Assembly	Color Code
Proportional valve assembly, head left			
WC SEAT (working seat cushion)	1	Left	Black/black
LT WC (left working cushion)	2	Left	Black/blue
WC HEAD (working head cushion)	3	Left	Green/green
LT BOOST (Left boost—extended rotation)	4	Left	Green/yellow
SS FOOT (foot sleep surface)	5	Left	Yellow/black
SS SEAT (seat sleep surface)	6	Left	Red/black
Proportional valve assembly, head right			
CHEST (chest sleep surface)	7	Right	Green/black
VENT	8	Right	Yellow/red
RT BOOST (extended rotation)	9	Right	Green/yellow
RT SC (right working cushion)	10	Right	Black/blue
SS HEAD (head sleep surface)	11	Right	Red/green
CRADLE	12	Right	Red/red

The affected cushion shows signs of deflation within 1 to 3 minutes.

Yes **No**
↓ → Go to step 8.

7. Go to step 9.

8. Touch SETUP UNIT FOR PATIENT on the Main Menu, and verify that the patient and cushion setup information is proper for the patient.

   All patient and cushion parameters are correct.

   Yes **No**
   ↓ → Set the patient/cushion parameters. If this solves the problem, go to “Final Actions” on page 2-10. Otherwise, go to step 9.

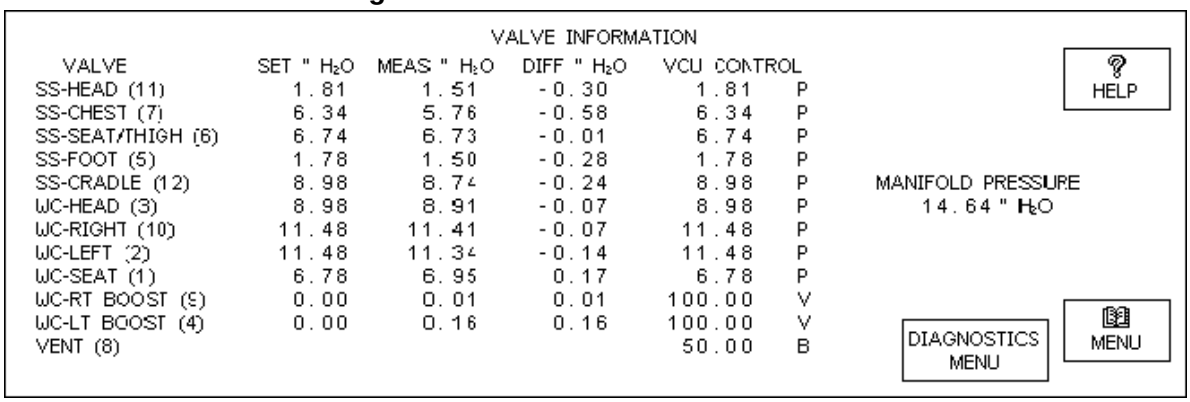
9. Perform the following:

   a. Enter the Service Options Menu (refer to procedure 6.5), and touch Diagnostics.

   b. On the Diagnostics Menu, touch Valve Information.

c. Monitor the valve pressures to identify a possible valve problem (see figure 2-8 on page 2-29).

Figure 2-8. Valve Information Screen


VALVE INFORMATION
VALVE
SET " H2O
MEAS " H2O
DIFF " H2O
VCU CONTROL
SS-HEAD (11) 1.81 1.51 -0.30 1.81 P
SS-CHEST (7) 6.34 5.76 -0.58 6.34 P
SS-SEAT/THIGH (6) 6.74 6.73 -0.01 6.74 P
SS-FOOT (5) 1.78 1.50 -0.28 1.78 P
SS-CRADLE (12) 8.98 8.74 -0.24 8.98 P
WC-HEAD (3) 8.98 8.91 -0.07 8.98 P
WC-RIGHT (10) 11.48 11.41 -0.07 11.48 P
WC-LEFT (2) 11.48 11.34 -0.14 11.48 P
WC-SEAT (1) 6.78 6.95 0.17 6.78 P
WC-RT BOOST (9) 0.00 0.01 0.01 100.00 V
WC-LT BOOST (4) 0.00 0.16 0.16 100.00 V
VENT (8) 50.00 B
HELP
MANIFOLD PRESSURE
14.64 " H2O
DIAGNOSTICS MENU
MENU

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NOTE:
The valve motor for each zone can move a maximum of 120 steps in either the positive (boosting) or the negative (venting) direction. The numbers in the VCU Control column refer to an average valve motor position for the zone. However, the averages actually have different meanings, depending on how the unit is set up. If the unit is set to a manifold pressure (e.g., 14.64"H_2O), the valve position shows an actual count, which is updated every 5 seconds. If the unit is set to a position, the number shown is a percentage of the maximum number of steps. Thus, when set to a position, 100% vent appears as -120, and 75% appears as -90. When the valve position counts for a pressure setting for high (above 40 for the sleep surface head and foot, or above 80 for any other zone), a 900-series error code displays. Also, counts that are erratically variable below the alarm range indicate that a valve is having a problem maintaining pressure in the zone.

Erratic valve operation is observed.

NOTE:
If the blower is running, but not running fast enough to properly inflate the cushions, the control panel is a possible cause of the problem. The speed signal for the blower comes from the control panel.

Yes **No**

↓ → Replace the control panel (refer to procedure 4.8). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 10.

NOTE:
If necessary, refer to the Help Screen (? icon) under the History menu of the Service Options screen for possible failures.

10. Replace the valve assembly containing the damaged valve (refer to procedure 4.14).

    This solves the problem.

    Yes **No**
    ↓ → Contact Technical Support at (800) 445-3720 for assistance.

11. Go to “Final Actions” on page 2-10.

2.6 Maximum Inflate Malfunction

1. The air supply hose is properly connected at the air supply unit and the air mattress.

   Yes **No**
   ↓ → Connect the air supply hose to the air supply unit and the air mattress.

2. The indicator light next to the Max. Inflate button on the air supply unit comes on when the button is pressed.

   Yes **No**
   ↓ → Replace the control panel (refer to procedure 4.8). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 3.

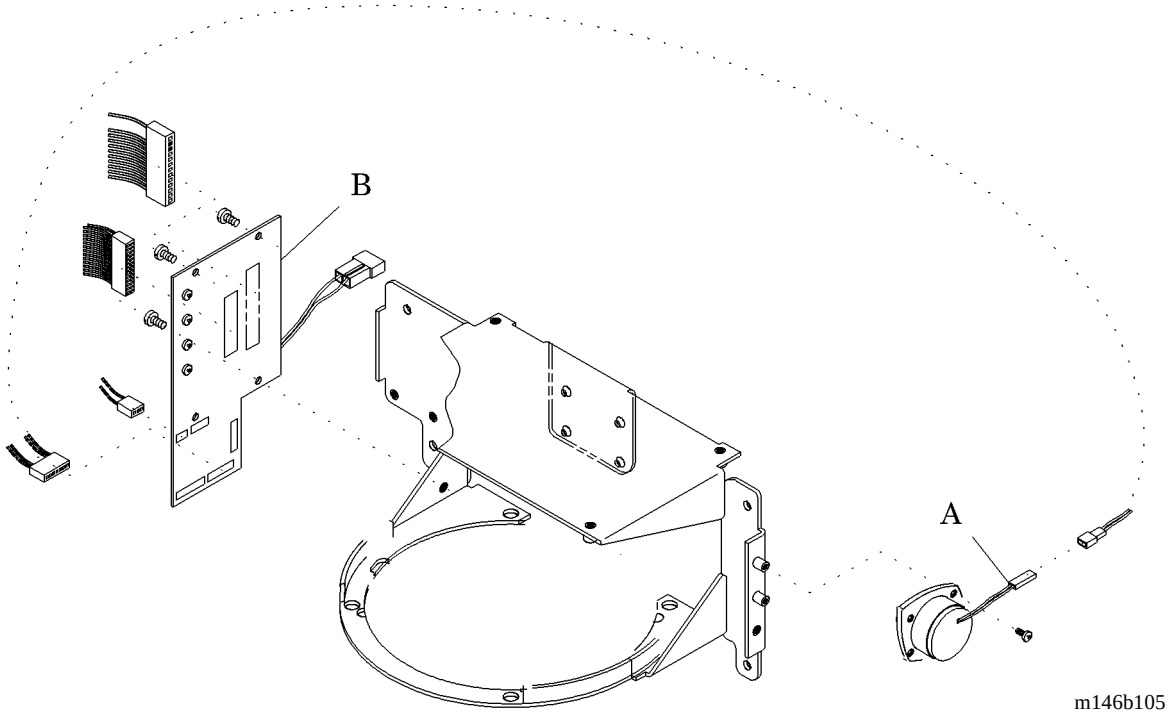
3. An alarm sounds when the Max. Inflate button is pressed.

   Yes **No**
   ↓ → Access the Service Menu, and adjust the tone and volume. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 5.

4. An alarm sounds when the Max. Inflate button is pressed.

   Yes **No**
   ↓ → Check the beeper cable assembly (A) at JP5, pins 1 and 2, on the battery charger P.C. board (B) (see figure 2-9 on page 2-32). If the wiring is not good, replace it. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 5.

Figure 2-9. Beeper Wiring



5. An alarm sounds when the Max. Inflate button is pressed.

   Yes **No**
   ↓ → Replace the beeper cable assembly (A) (refer to procedure 4.4). If this solves the problem, go to "Final Actions" on page 2-10. If not, call Hill-Rom Technical Support at (800) 445-3720 for assistance.

6. There is a noticeable increase in blower speed when Maximum Inflate is on.

   Yes **No**
   ↓ → Replace the control panel (refer to procedure 4.8). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 5.

7. There is still a noticeable increase in blower speed when Maximum Inflate is on.

   Yes **No**
   ↓ → Replace the blower (refer to procedure 4.5). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 8.

8. Check the connections of the air feed tubes to the following control valve assemblies inside the mattress:
   - Two at the P/V valve at the patient foot left
   - One at the proportional valve set at patient head left
   - One at the proportional valve set at patient head right

   All air feed tubes are firmly connected to their control valve assemblies.

   Yes **No**
   ↓ → Connect the air feed tube to the control valve assembly. If this solves the problem, go to “Final Actions” on page 2-10. Otherwise, go to step 9.

9. Listen for an air leak at the mattress in the area of the hoses, valve assemblies, and individual cushions.

   An air leak is detected.

   Yes **No**
   ↓ → Contact Technical Support at (800) 445-3720 for assistance.

10. Repair the leak by inserting the hose completely into the connection or by replacing the leaking component (refer to the Chapter Contents of Chapter 4 to locate the procedure for replacing the leaking component).

    This solves the problem.

    Yes **No**
    ↓ → Call Hill-Rom Technical Support at (800) 445-3720 for assistance.

11. Go to “Final Actions” on page 2-10.

2.7 CPR Malfunction

1. The air supply hose electrical connection is good at the mattress and at the air supply unit.

   Yes **No**
   ↓ → Repair the connection, or replace the air supply hose. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 2.

2. All electrical connections in the mattress on the P/V valve assembly, left proportional valve assembly, and right proportional valve assembly are in good condition and are properly connected.

   Yes **No**
   ↓ → Repair the connections. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 3.

3. The blower stops when the CPR button is pressed.

NOTE:
The wiring harnesses' blower end is located inside the blower.

Yes **No**
↓ → Check the wiring harness ends from the control panel to the battery charger P.C. board and the ends from the battery charger P.C. board to the inside of the blower. If the wiring is bad, replace it. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 4.

4. The blower stops when the CPR button is pressed.

   Yes **No**
   ↓ → Replace the control panel (refer to procedure 4.8). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 5.

5. Determine which mattress cushions are still inflated. Refer to table 2-3 on page 2-28 for a listing of valve locations for each cushion. Replace the valve assembly for those cushions that are still inflated (refer to procedure 4.14).

   This solves the problem.

   Yes **No**
   ↓ → Contact Hill-Rom Technical Support at (800) 445-3720 for assistance.

6. Go to "Final Actions" on page 2-10.

2.8 Rotation Malfunction

NOTE:
This procedure may apply to malfunctions in the Turn Assist mode, as well. Also, an error code will appear on the touch screen. The error code indicates whether the problem is related to the head-of-bed angle or the siderail sensors. If the error message indicates a problem with the head-of-bed angle, start with step 1. If the error message indicates a siderail problem, start with step 2.

1. The head elevation is less than 40°.

   Yes **No**
   ↓ → Lower the head. (Rotation mode will not operate when the head is elevated above 40°.) If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 2.

2. The siderail sensors are securely attached to the bed frame.

   Yes **No**
   ↓ → Go to step 4.

3. Go to the Main Menu, and touch Therapy Selection.

   a. At the Therapy Mode/Selection screen, touch Rotation and Enter.

   b. Review the information on the Rotation Summary screen.

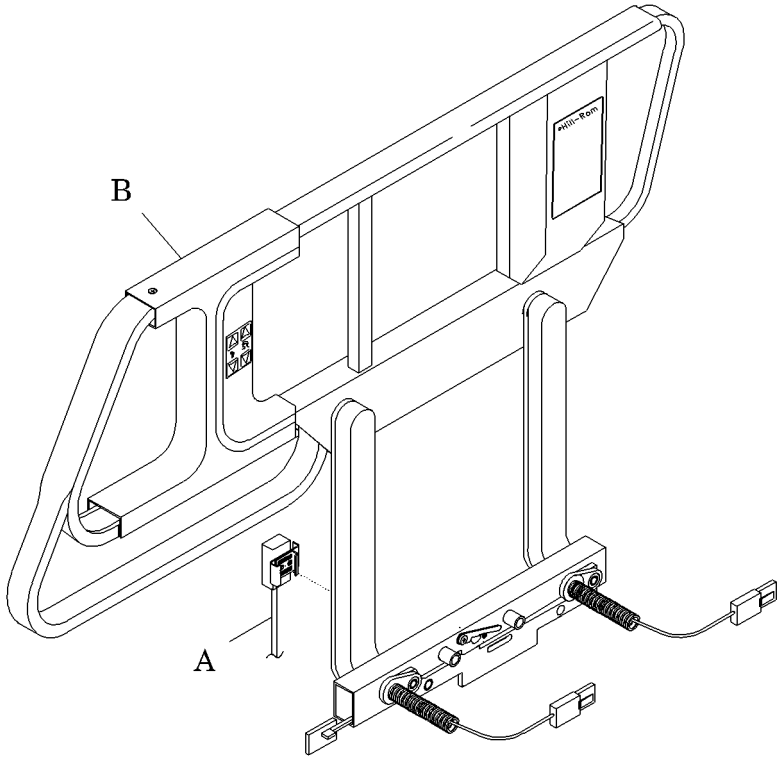
   Left and right "% Rotation" is greater than 50, and pause time for all positions is greater than 0.05 minutes.

   Yes **No**
   ↓ → A very low "% Rotation" or a very long pause interval might seem like a rotation malfunction to the patient or caregiver. Change the settings as needed, and observe the rotation function. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 4.

4. The siderail position sensor (A) in-line connectors are secure, and both siderail position sensors (A) are properly attached to the head end siderails (B) (see figure 2-10 on page 2-36).

   Yes **No**
   ↓ → Properly secure the siderail position sensor (A) connector(s) and/or attach the siderail position sensor(s) (A) to the head end siderail (B). If the problem is solved, go to "Final Actions" on page 2-10. Otherwise, go to step 5.

Figure 2-10. Siderail Sensor Connectors



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5. Both head end siderails (B) are up.

   Yes **No**
   ↓ → Raise the head end siderails (B). If the problem is solved, go to "Final Actions" on page 2-10. Otherwise, go to step 6.

6. Replace the siderail position sensors (A) (refer to procedure 4.19). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 7.

7. Check the routing of the working cushion hoses in the air mattress by looking at the hose routing schematic located on the top of the proportional valves.

   The working cushion hoses are routed to the proper cushions.

   Yes **No**
   ↓ → Route the hoses properly. If the problem is solved, go to "Final Actions" on page 2-10. Otherwise, go to step 8.

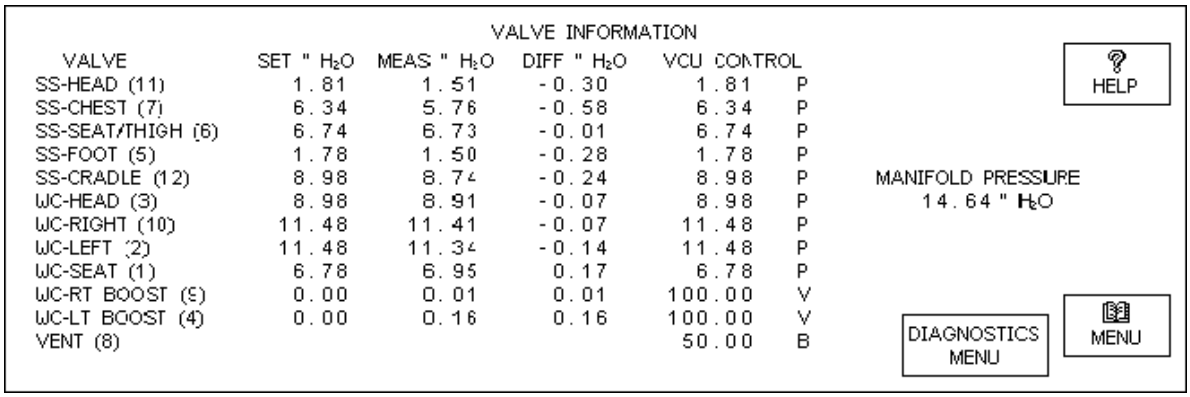
8. Check the integrity of the cushions.

   The cushions have no holes or cuts.

Yes **No**
↓ → Repair the cushion, or replace the mattress. If the problem is solved, go to "Final Actions" on page 2-10. Otherwise, go to step 9.

9. Check the Valve Information screen in the Diagnostic menu (see figure 2-11 on page 2-37).

Figure 2-11. Valve Information Screen


VALVE INFORMATION
VALVE SET " H2O MEAS " H2O DIFF " H2O VCU CONTROL
SS-HEAD (11) 1.81 1.51 -0.30 1.81 P
SS-CHEST (7) 6.34 5.76 -0.58 6.34 P
SS-SEAT/THIGH (6) 6.74 6.73 -0.01 6.74 P
SS-FOOT (5) 1.78 1.50 -0.28 1.78 P
SS-CRADLE (12) 8.98 8.74 -0.24 8.98 P
WC-HEAD (3) 8.98 8.91 -0.07 8.98 P
WC-RIGHT (10) 11.48 11.41 -0.07 11.48 P
WC-LEFT (2) 11.48 11.34 -0.14 11.48 P
WC-SEAT (1) 6.78 6.95 0.17 6.78 P
WC-RT BOOST (9) 0.00 0.01 0.01 100.00 V
WC-LT BOOST (4) 0.00 0.16 0.16 100.00 V
VENT (8) 50.00 B
HELP
MANIFOLD PRESSURE
14.64 " H2O
DIAGNOSTICS MENU
MENU

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All valves meet their setting criteria.

Yes **No**
↓ → Replace the valve assembly that has the non-performing valve. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 10.

10. Replace the control panel (refer to procedure 4.8).

    This solves the problem.

Yes **No**
↓ → Contact Technical Support at (800) 445-3720 for assistance.

11. Go to "Final Actions" on page 2-10.

2.9 OPTI•REST Mode Malfunction

NOTE:
The OPTI•REST Mode provides a gentle massaging action. It cannot be adjusted to increase the speed, pressure, or any other factors. If the problem with the OPTI•REST Mode is a matter of comfort, confirm the proper height, weight, and comfort settings.

1. The problem occurs in OPTI•REST Mode only.

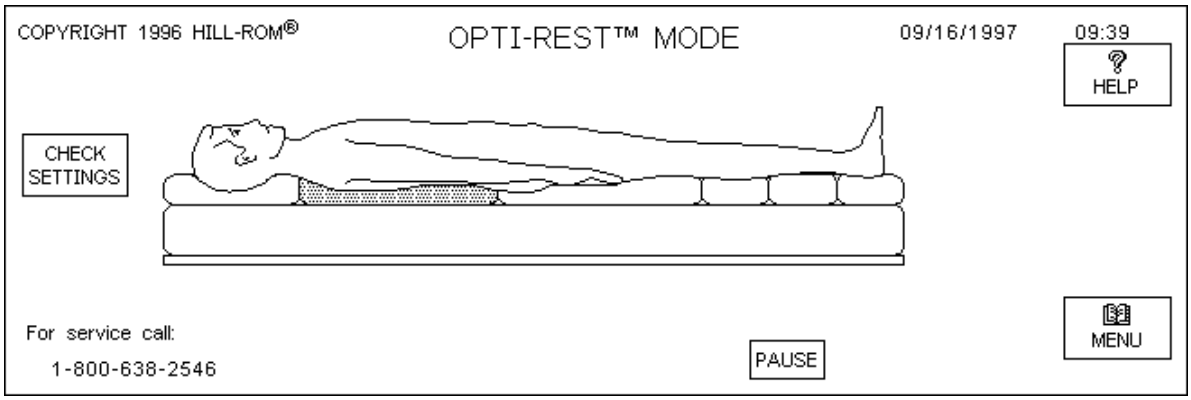
   Yes ↓

   No → If the problem exist in other therapy modes, refer to the following RAP numbers to determine the cause. If you have already performed the troubleshooting procedures in each of the other RAPs, and the problem is not solved, call Hill-Rom Technical Support at (800) 445-3720 for assistance.

   - For Rotation Malfunction, go to RAP 2.8.
   - For Cushion Inflation Malfunction, go to RAP 2.5.
   - For Blower Malfunction, go to RAP 2.4.
   - For Control Malfunction, go to RAP 2.3.

2. Perform the following:
   a. At the Main Menu on the air supply unit, touch the Therapy Selection.
   b. On the Therapy Mode/Settings screen, touch the OPTI•REST Mode selection.
   c. Press ENTER.
   d. Press MENU.
   e. Observe the graphic on the OPTI•REST MODE screen (see figure 2-12 on page 2-39).

Figure 2-12. OPTI-REST MODE Screen Display



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The cushions below the supine figure light up in sequence at 10 to 15 second intervals as the corresponding sleep surface cushions inflate and deflate.

Yes **No**
↓ → If the hoses are properly not connected for the chest, seat/thigh, or foot sleep surface cushions, connect them properly. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 3.

3. The cushions light up in sequence at 10 to 15 second intervals as the sleep surface cushions inflate and deflate.

   Yes **No**
   ↓ → Check the integrity of each of these cushions. Replace any cushions with holes. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 4.

4. Perform the actions in step 2 to place the unit in OPTI•REST Mode, and access the valve information.

   a. Enter the Service Options Menu (refer to procedure 6.5), and touch Diagnostics.

   b. On the Diagnostics Menu, touch Valve Information.

   c. Observe the valve pressure readings in Zones 5, 6, and 7.

   The pressure readings are the same as those shown in table 2-4 on page 2-40, and they alternate approximately every 10 to 15 seconds.

Table 2-4. OPTI•REST Mode Valve Pressure Readings

Zone	High Pressure Reading	Low Pressure Reading
SS CHEST (7)	5.7	00.00
SS SEAT/THIGH (6)	5.82	00.00
SS FOOT (5)	1.57	00.00

Yes ↓ **No** → See whether the hoses are properly connected for the chest, seat/thigh, and foot sleep surface cushions. If not, connect them properly. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 5.

5. The pressure readings are the same as those shown in table 2-4 on page 2-40, and they alternate approximately every 10 to 15 seconds.

   Yes ↓ **No** → Check the integrity of each of these cushions. If any have holes, replace them. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to RAP 2.5.

6. Go to "Final Actions" on page 2-10.

2.10 Low Battery/Battery Charger Malfunction

1. The unit has been plugged into an appropriate power source for at least 48 hours.

   Yes **No**
   ↓ → Wait until the unit has been plugged into an appropriate power source for at least 48 hours. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 2.

2. Perform the following:

   a. Access the Service Options Menu.

   b. Access the Diagnostics Menu.

   c. Access the Battery Information Menu.

NOTE:
The battery charger automatically shuts off for 20 second intervals every 15 minutes. When the battery charger shuts off, the battery is under a full load.

   The screen display shows that the battery voltage is between 12.7V DC and 13.9V DC while the battery charger is on, and that the battery voltage is above 12.6V DC while the battery charger is off.

   Yes **No**
   ↓ → If the battery voltage is less that 12V DC when the battery charger is on, inspect the battery cable for damage. If the battery cable is damaged, replace it. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 3.

3. The screen display shows that the battery voltage is between 12.7V DC and 13.9V DC while the battery charger is on, and that the battery voltage is above 12.6V DC while the battery charger is off.

   Yes **No**
   ↓ → If the battery voltage is less that 12V DC when the battery charger is on, inspect the battery cable for damage. If the battery cable is not damaged, replace the battery charger P.C. board (refer to procedure 4.3). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 4.

4. The screen display shows that the battery voltage is between 12.7V DC and 13.9V DC while the battery charger is on, and that the battery voltage is above 12.6V DC while the battery charger is off.

   Yes **No**
   ↓ → If the battery voltage is less that 12V DC when the battery charger is off, replace the battery (refer to procedure 4.2). If

either of these actions solve the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 8.

5. Return to the Service Options Menu and access the History Menu using the up and down arrows to scroll through the listing.

   The History Menu listings show a number of low battery alarms during the past few days.

   Yes **No**
   ↓ → Go to step 8.

6. Replace the battery (refer to procedure 4.2).

   This solves the problem.

   Yes **No**
   ↓ → Call Technical Support at (800) 445-3720 for assistance.

7. Go to "Final Actions" on page 2-10.

8. The air supply unit has been sitting idle without power applied for more than 55 days.

   Yes **No**
   ↓ → Go to step 11.

9. Replace the battery (refer to procedure 4.2).

   This solves the problem.

   Yes **No**
   ↓ → Replace the battery charger P.C. board (refer to procedure 4.3). If the problem is solved, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720 for assistance.

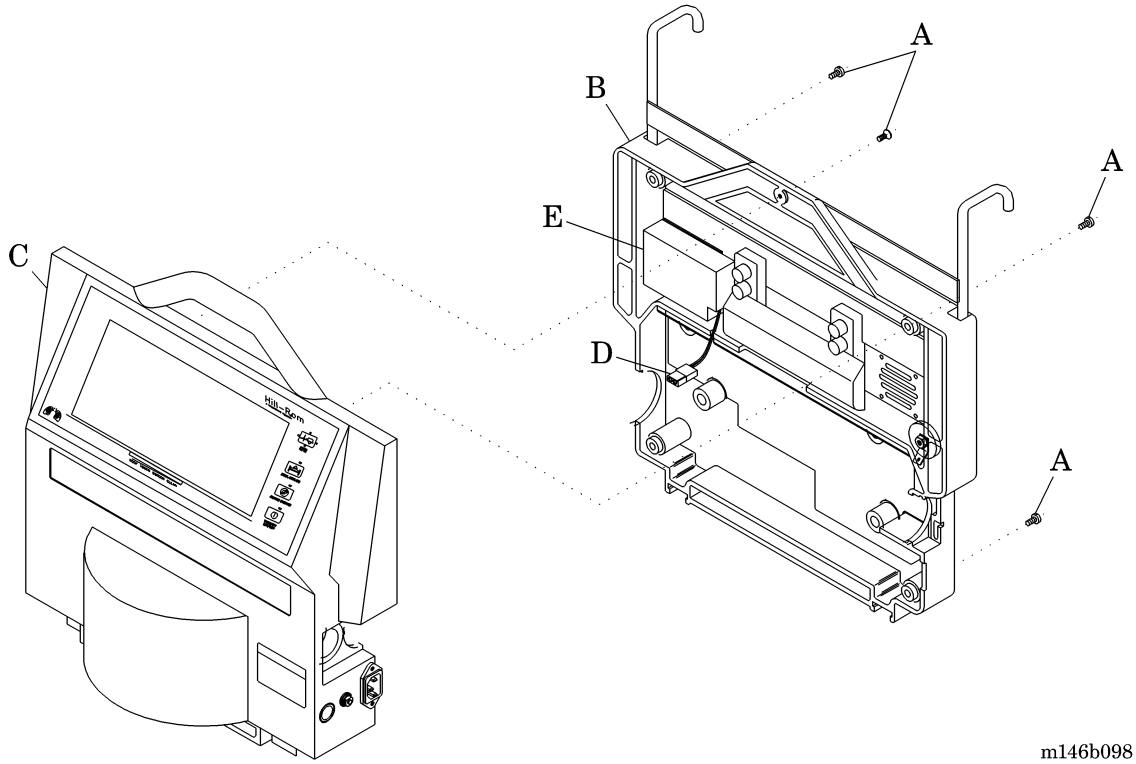
10. Go to "Final Actions" on page 2-10.

11. Perform the following:

    a. Unplug the unit from its power source, and remove the air supply hose (if attached).

    b. Using a phillips head screwdriver, remove the five screws (A) that secure the rear case (B) to the front case (C) (see figure 2-13 on page 2-43).

Figure 2-13. Air Supply Unit Case



c. Carefully pull the rear case (B) from the front case (C).

SHOCK HAZARD:
Avoid touching the power supply P.C. board heat sink. When power is applied to the unit, contact with the power supply P.C. board heat sink could result in severe injury or death.

CAUTION:
Ensure the leads from the battery and the battery charger P.C. board are properly connected and routed. Failure to do so could result in equipment damage.

d. Avoid touching the power supply P.C. board heat sink, and check the connection and integrity of the lead (D) from the battery (E) to the lead from the battery charger P.C. board. Equipment damage can occur if the leads (D) are not properly connected and routed.

The leads (D) are firmly connected.

Yes **No**
↓ → Connect the leads. If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 12.

12. The leads are firmly connected.

    Yes **No**
    ↓ → Replace the battery (refer to procedure 4.2). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, go to step 13.

13. The leads are firmly connected.

    Yes **No**
    ↓ → Replace the battery charger P.C. board (refer to procedure 4.3). If this solves the problem, go to "Final Actions" on page 2-10. Otherwise, call Hill-Rom Technical Support at (800) 445-3720 for assistance.

14. Go to "Final Actions" on page 2-10.

Chapter 3
Theory of Operation

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NOTES:

Voltage Distribution

Figure 3-1. AC and DC Voltage Distribution (120V Model Only)

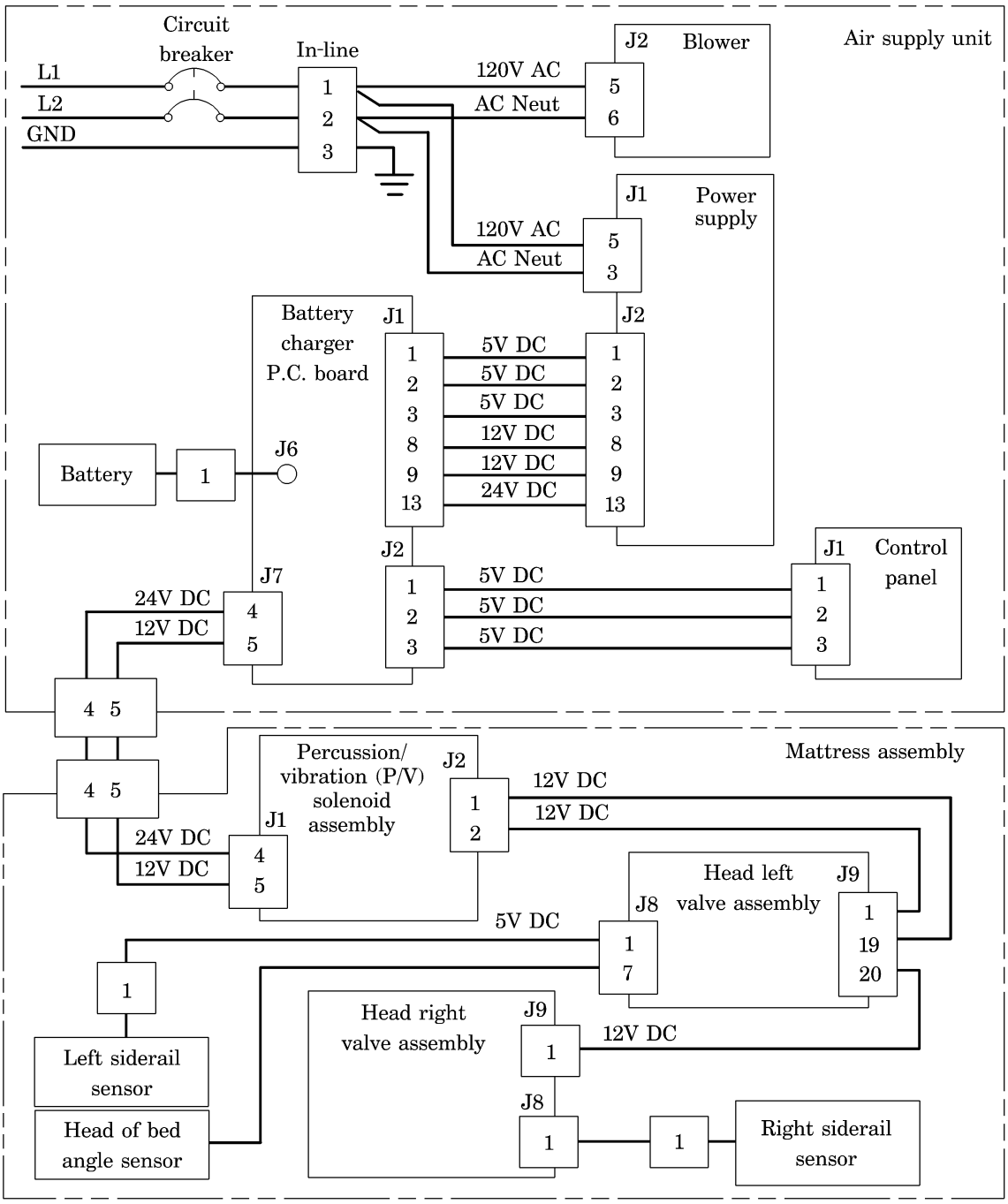

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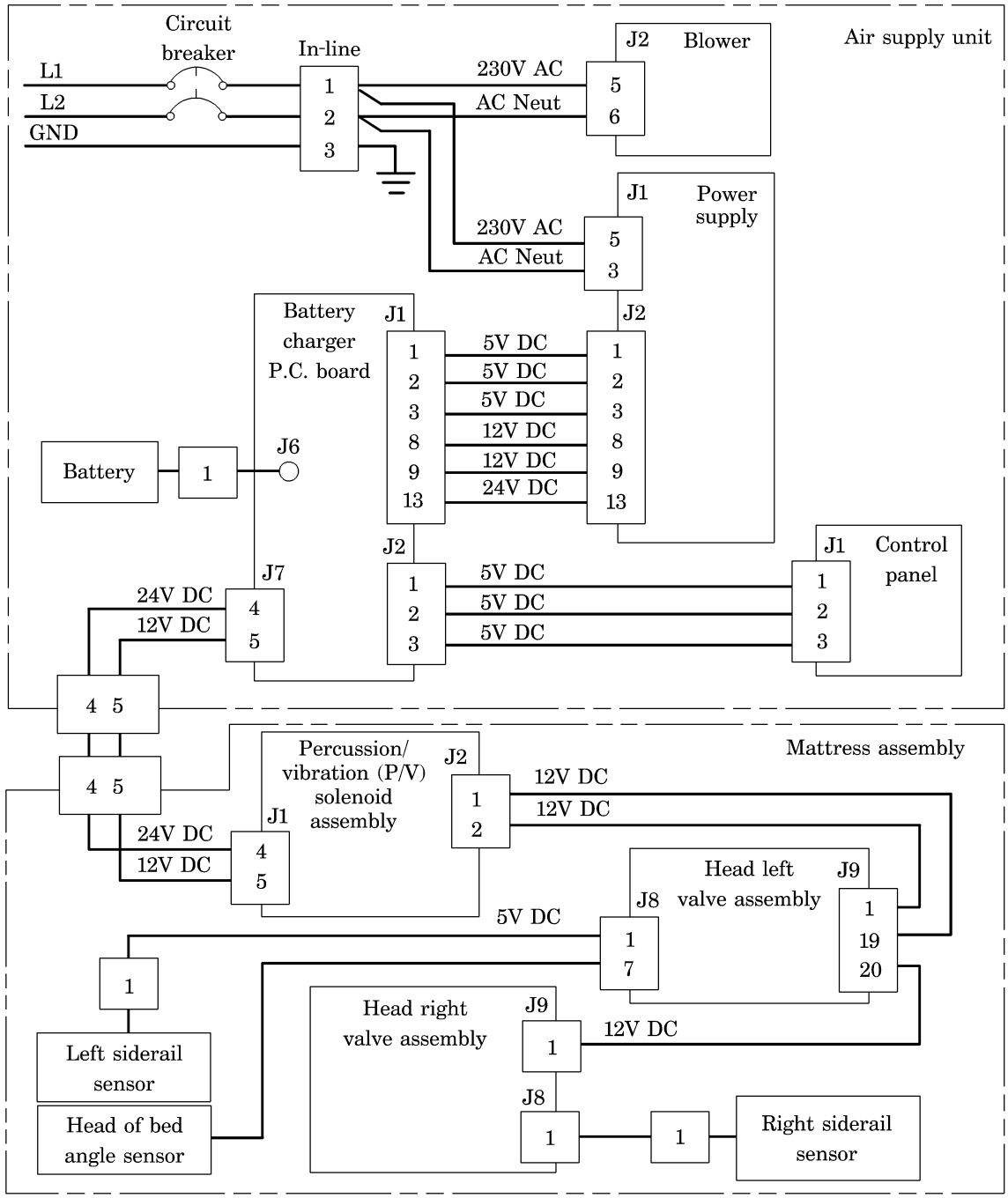
Figure 3-2. AC and DC Voltage Distribution (230V Model Only)



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Integrated Wiring Diagram

Figure 3-3. Integrated Wiring Diagram

Refer to fold-out FO 3-1 (120V model only) and
fold-out FO 3-2 (230V model only) at the rear of this manual.

Plug Jack Connections

Figure 3-4. Battery Charger P.C. Board Plug Jack Connections

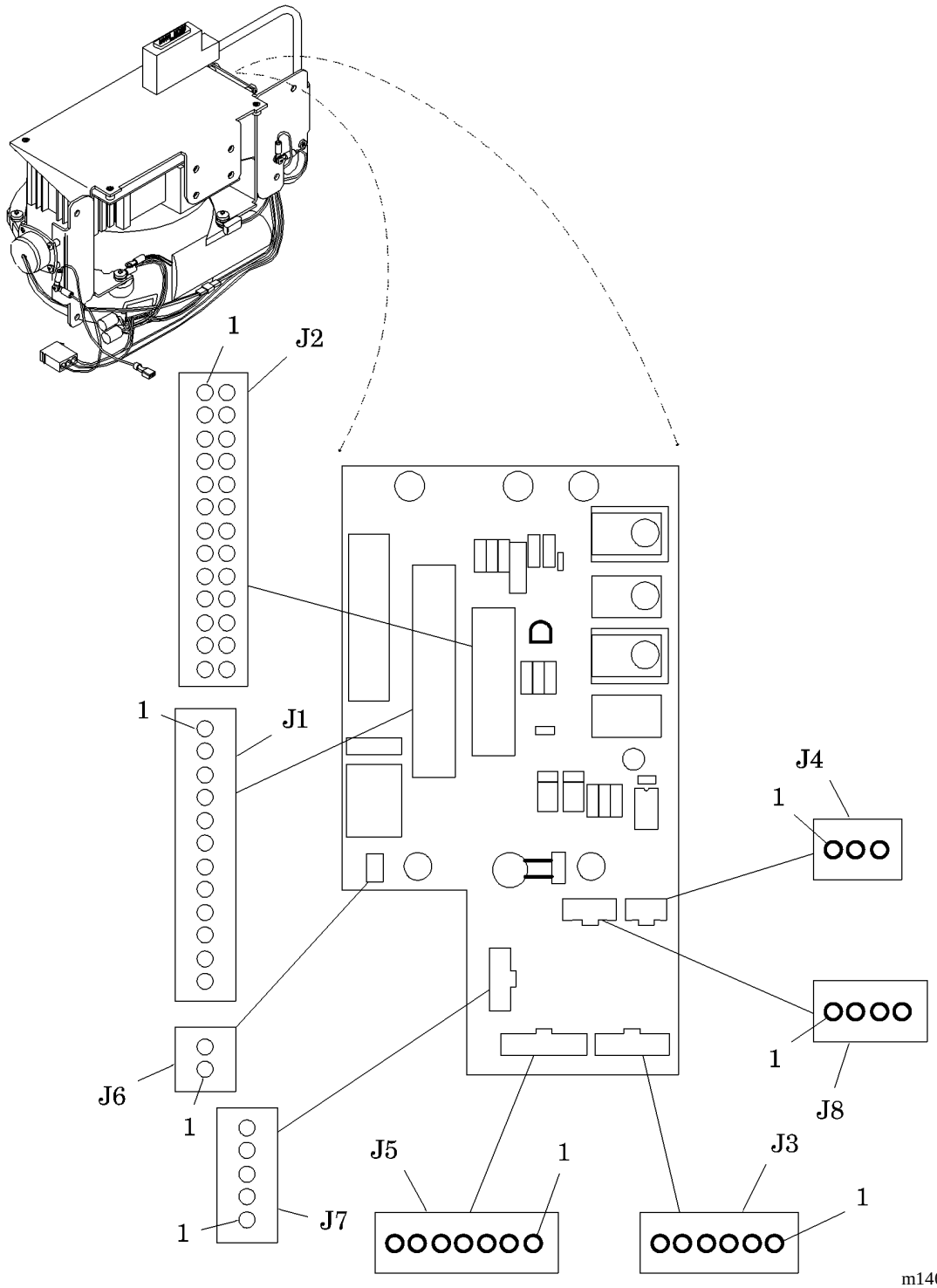

Figure 3-5. P/V Valve P.C. Board Plug Jack Connections

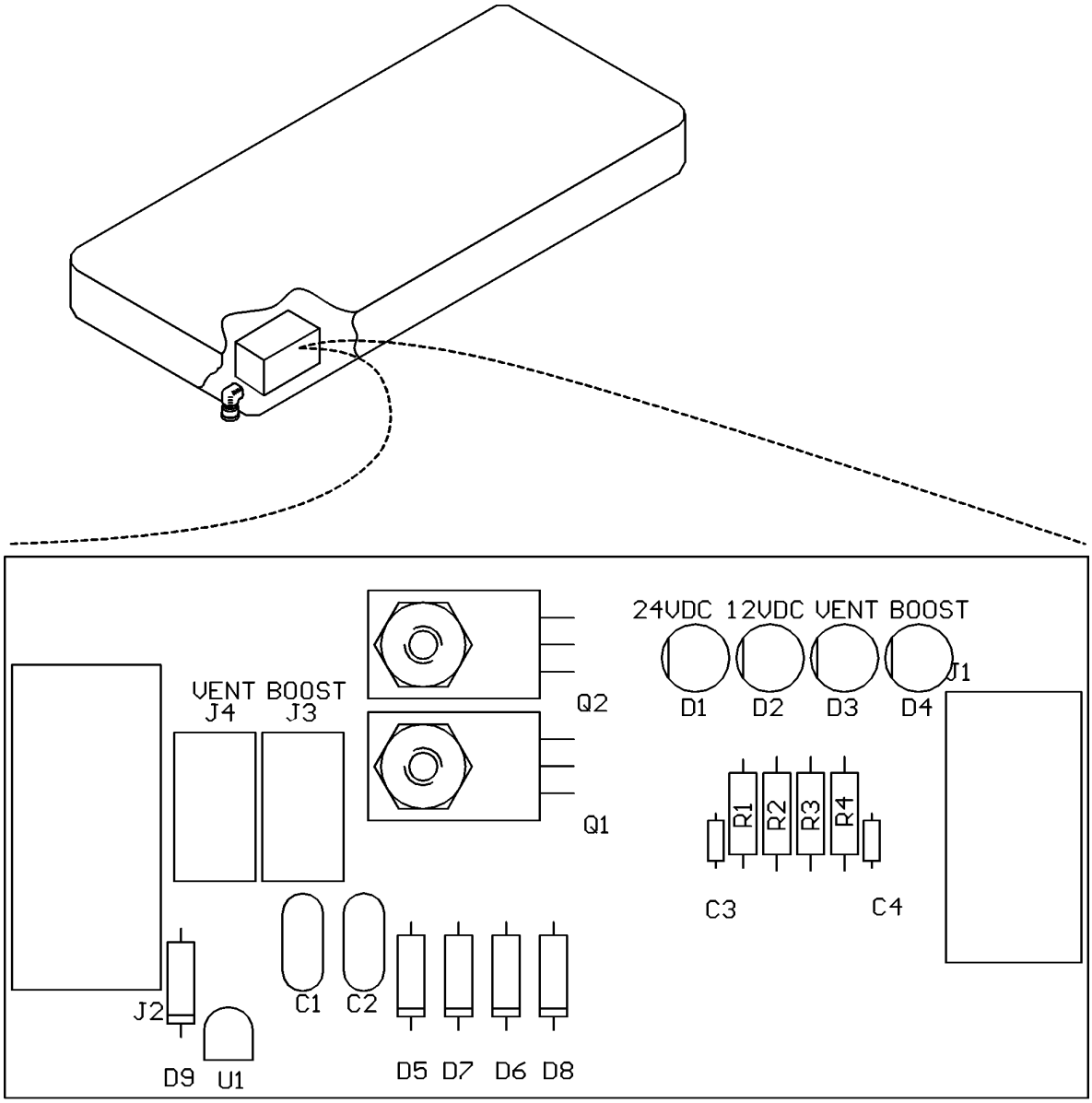

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Figure 3-6. Left Proportional Valve P.C. Board Plug Jack Connections

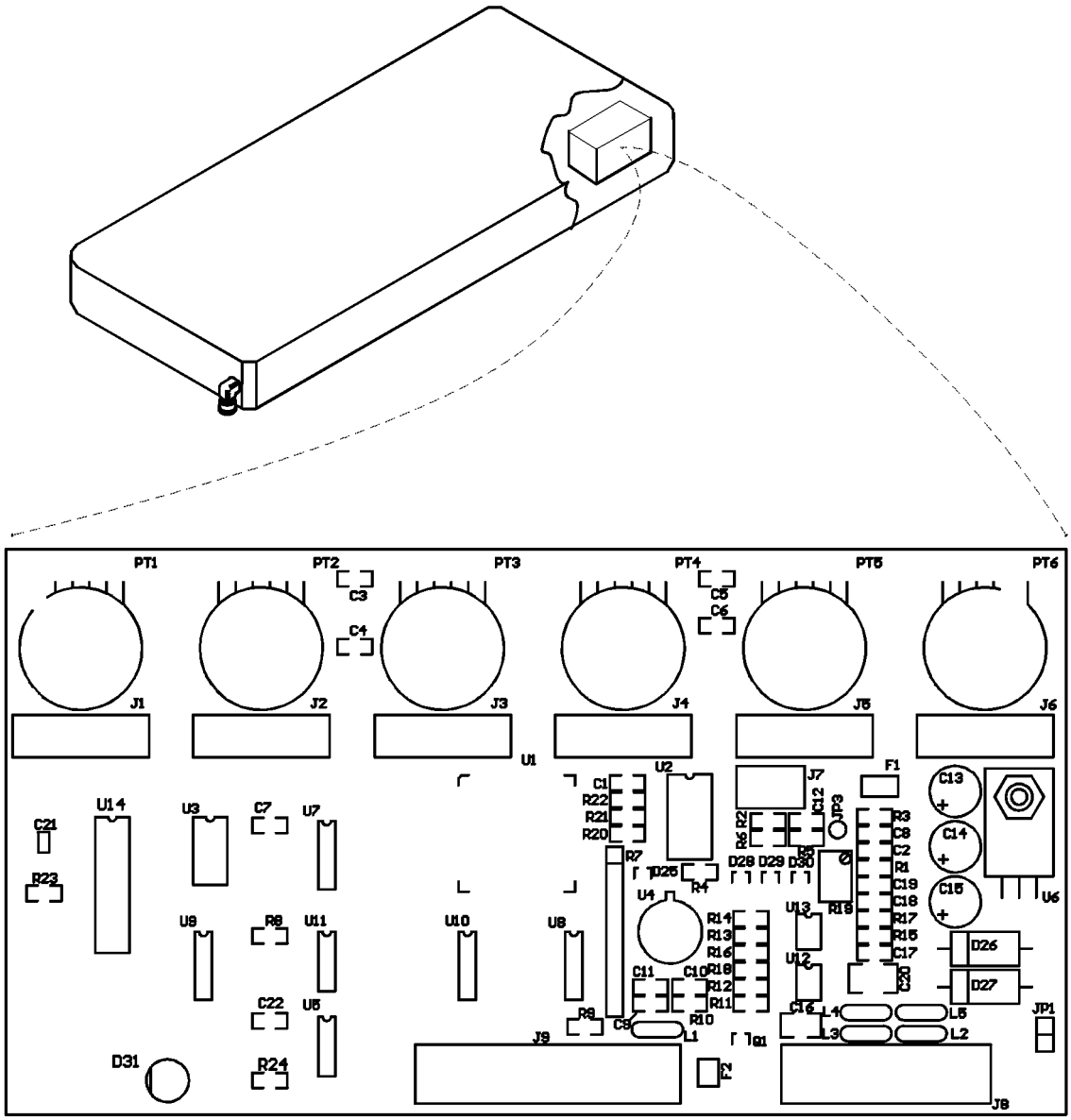

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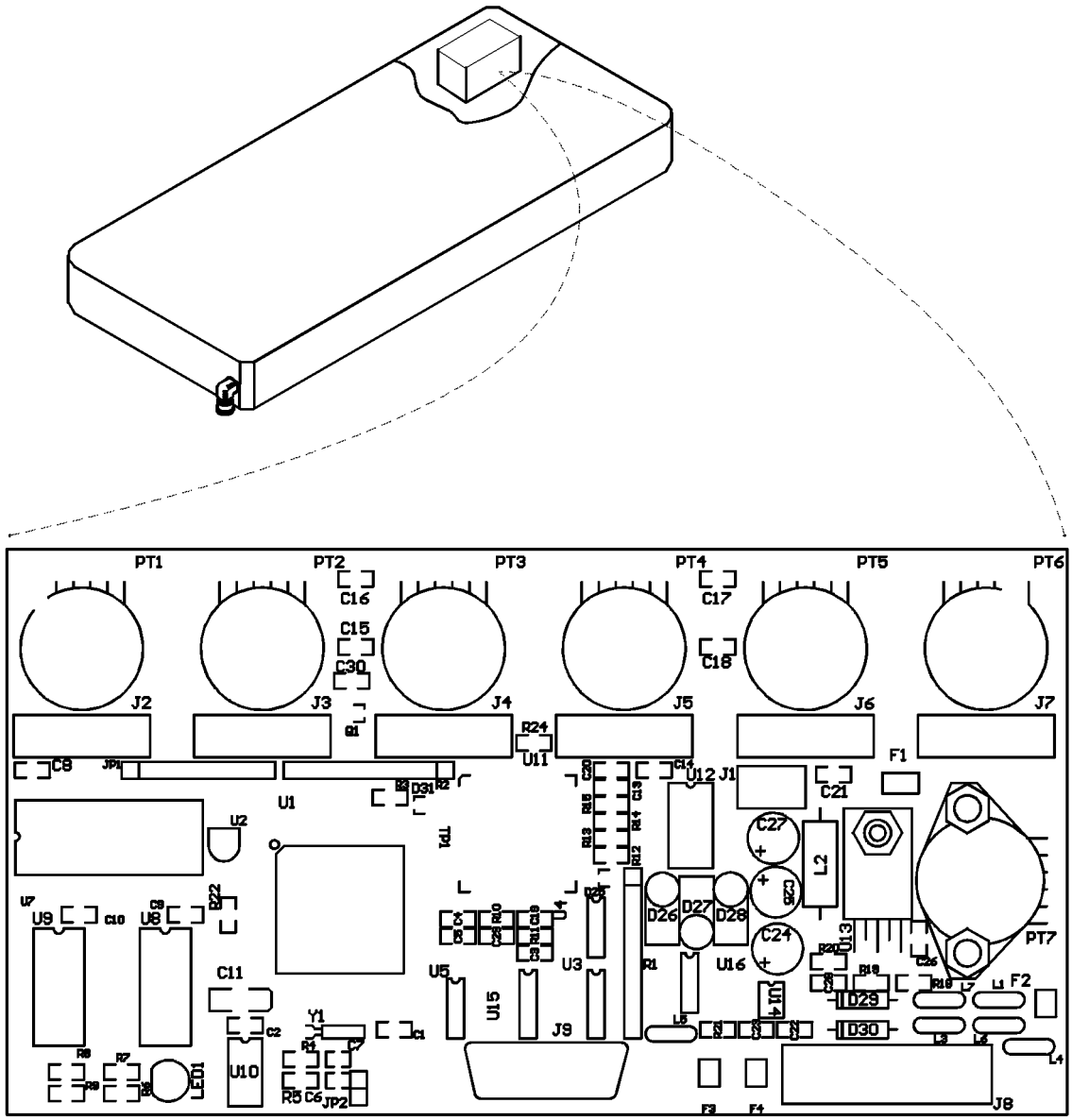
Figure 3-7. Right Proportional Valve P.C. Board Plug Jack Connections



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Theory of Operation

The V-CUE™ Dynamic Air Therapy® Unit has four parts:

- Air supply unit
- Air supply hose
- Mattress assembly
- Software

Air Supply Unit

The air supply unit houses the components that generate and control the airflow that is provided through the air supply hose to the mattress. The air supply unit has three subsystems:

- Mechanical
- Electrical
- Pneumatic

Mechanical Components

The molded case of the air supply unit can be separated into three pieces, front and rear, providing access to internal components. The third piece is the air filter cover. The front cover contains the liquid crystal display (LCD) screen along with the CPR, Maximum Inflate, Alarm Silence, and Therapy On/Off buttons. Most of the internal components are mounted to the front half of the case.

The hanger brackets located on the rear cover attach to a bed footboard, or the unit is also designed to be placed on the floor.

Electrical Components (120V Model Only)

AC voltage input is applied to the unit via a three-conductor line cord. The line cord is attached to the power inlet. The unit receives power as soon as the power cord is plugged into an appropriate power source. This is indicated by a 120V AC pilot lamp on the side of the unit that is illuminated when the unit is receiving power.

Input to the power supply in the unit is 120V AC ± 10% at 60 Hz ± 1Hz. Circuitry on the power supply P.C. board converts and rectifies the AC voltage

and provides 5V DC, 12V DC, and 24V DC output to the battery charger P.C. board.

Electrical Components (230V Model Only)

AC voltage input is applied to the unit via a three-conductor line cord. The line cord is attached to the power inlet. The unit receives power as soon as the power cord is plugged into an appropriate power source. This is indicated by a 230V AC pilot lamp on the side of the unit that is illuminated when the unit is receiving power.

Input to the power supply in the unit is 230V AC ± 10% at 50 Hz ± 1Hz. Circuitry on the power supply P.C. board converts and rectifies the AC voltage and provides 5V DC, 12V DC, and 24V DC output to the battery charger P.C. board.

Pneumatic Components

The blower provides the required air pressure to inflate the mattress assembly.

Pressures can be produced up to 25"H_2O (47 mm Hg). Pressure transducers provide feedback that controls the valves and blower speed. The pressure transducers are located with the valves in the head section of the cushions. The valve system is comprised of two sets of six valves. Each set is integrated with an air manifold and a power distribution P.C. board.

For the recommended pressure levels for each zone of the mattress if the patient weighs 200 lb (91 kg) and is 71" (180 cm) tall, refer to table 3-1 on page 3-12.

Table 3-1. Recommended Pressure Levels

Valve Number	Zone	Set Pressure	Tolerance
1	WC-SEAT	6.35"H_2O (11.86 mm Hg)	± 0.3"H_2O (0.6 mm Hg)
2	WC-LEFT	8.55"H_2O (15.97 mm Hg)	± 0.3"H_2O (0.6 mm Hg)
3	WC-HEAD	8.55"H_2O (15.97 mm Hg)	± 0.3"H_2O (0.6 mm Hg)
4	WC-LT BOOST	6.35"H_2O (11.86 mm Hg)	± 0.3"H_2O (0.6 mm Hg)
5	SS-FOOT	1.69"H_2O (3.16 mm Hg)	± 0.3"H_2O (0.6 mm Hg)
6	SS-SEAT/THIGH	6.31"H_2O (11.79 mm Hg)	± 0.3"H_2O (0.6 mm Hg)
7	SS-CHEST	5.03"H_2O (9.40 mm Hg)	± 0.3"H_2O (0.6 mm Hg)
9	WC-RT BOOST	6.35"H_2O (11.86 mm Hg)	± 0.3"H_2O (0.6 mm Hg)
10	WC-RIGHT	8.55"H_2O (15.97 mm Hg)	± 0.3"H_2O (0.6 mm Hg)
11	SS-HEAD	2.78"H_2O (5.19 mm Hg)	± 0.3"H_2O (0.6 mm Hg)
12	SS-CRADLE	8.55"H_2O (15.97 mm Hg)	± 0.3"H_2O (0.6 mm Hg)

The pressures above are measured in Standard mode. Pressure control of the manifold is maintained to within ± 0.5 "H_2O (± 0.9 mm Hg).

Air Supply Hose

The air supply hose is kink-resistant to prevent obstruction of airflow from the air supply unit to the air cushion assembly. The hose ends are interchangeable. One end attaches to the air supply unit, and the other end attaches to the air cushion.

Mattress Assembly

The mattress assembly is designed as a mattress replacement product. It is comprised of two tiers of cushions: an air cushion assembly on the upper tier, and substrate cushions on the lower tier. The substrate cushions, referred to as the working cushions, consist of three independent inflation bladders and two boost bladders. The left and right working cushions have internal seat bladders that operate independently. The upper cushions, referred to as the sleep surface, consist of five independent zones. These zones support the head, trunk, seat/thigh, and foot sections of the body. The fifth zone, the COMFORTGUARD® Cushion, located on the side of the cushions, keeps the patient centered on the sleep surface during rotation.

In the mattress assembly, cushion inflation is controlled by the left and right proportional valve assemblies. The valve assemblies are located in the left and right head end corners of the mattress; each contains six proportional valves. The P/V valve assembly is mounted in the foot left corner of the mattress. This assembly controls the percussion and vibration air pulses to the chest cushion.

Straps and ties are attached to the side of the mattress encasement (see figure 3-8 on page 3-14). They can be routed through the mattress subassembly for fastening to the bed frame. An opening on the left foot end allows attachment of the air supply hose to the sleep surface cushions. External components of the mattress assembly include the head-of-bed elevation sensor and the left/right siderail position sensors.

Details of the mattress assembly components are illustrated in figure 3-8 on page 3-14, figure 3-9 on page 3-15, figure 3-10 on page 3-16, figure 3-11 on page 3-17, figure 3-12 on page 3-18, and figure 3-13 on page 3-19.

Figure 3-8. Mattress Cushions

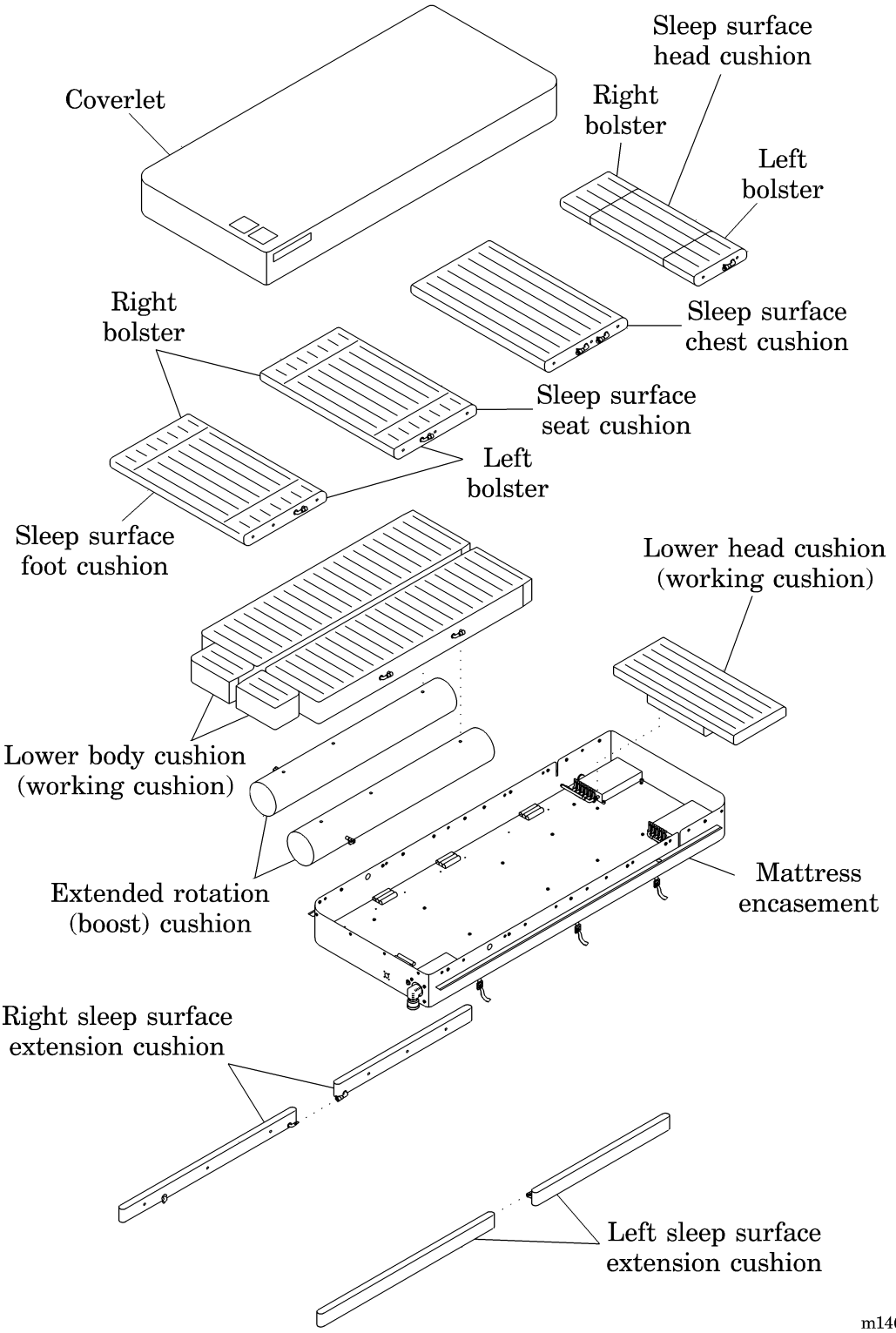

Figure 3-9. Mattress Hose Management

Refer to fold-out FO 3-3 at the rear of this manual.

Figure 3-10. Mattress Hose Connections

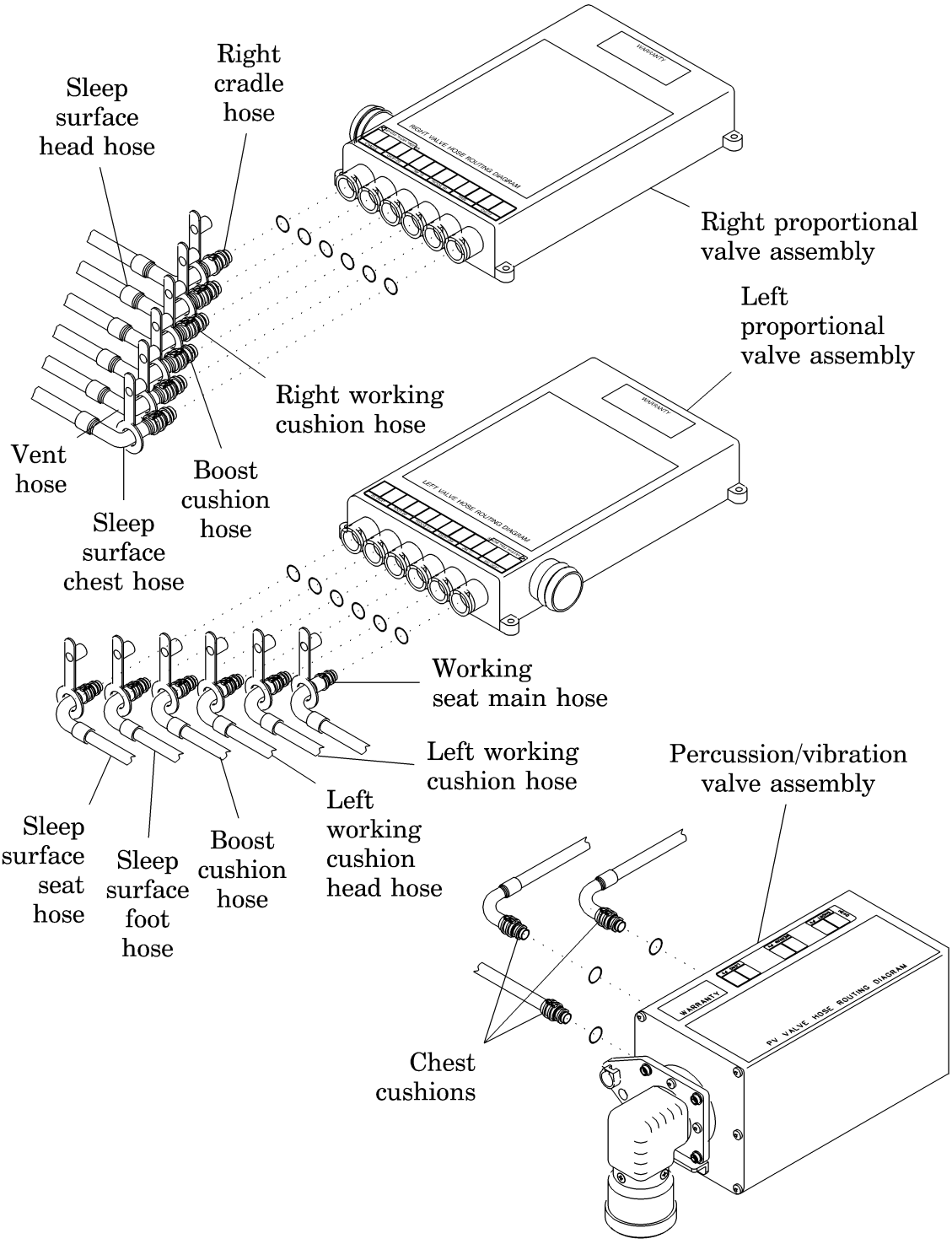

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Figure 3-11. Left Proportional Valve Hose Routing Diagram

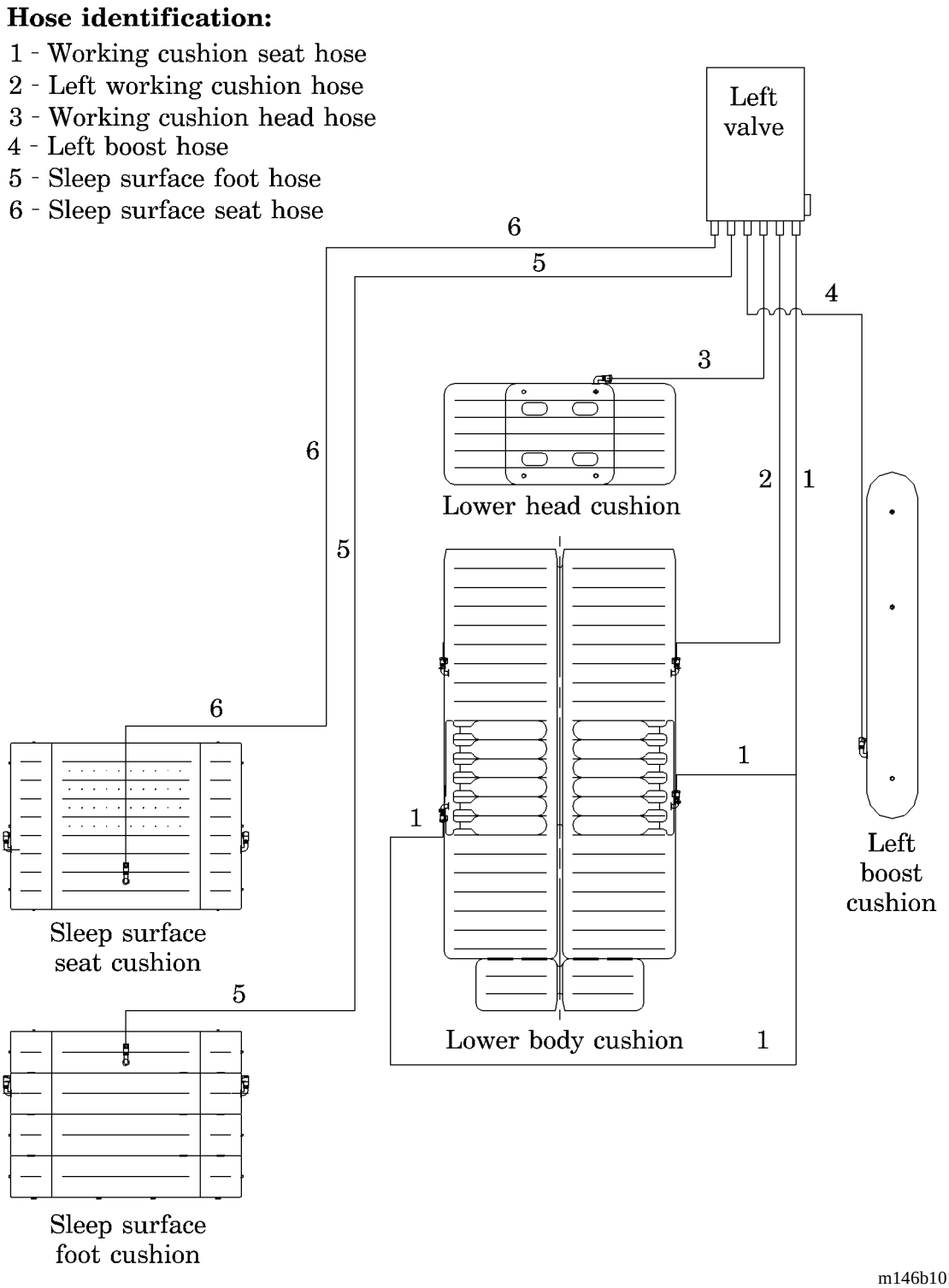
Hose identification:
1 - Working cushion seat hose
2 - Left working cushion hose
3 - Working cushion head hose
4 - Left boost hose
5 - Sleep surface foot hose
6 - Sleep surface seat hose
Left valve
Lower head cushion
Left boost cushion
Sleep surface seat cushion
Lower body cushion
Sleep surface foot cushion
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Figure 3-12. Right Proportional Valve Hose Routing Diagram

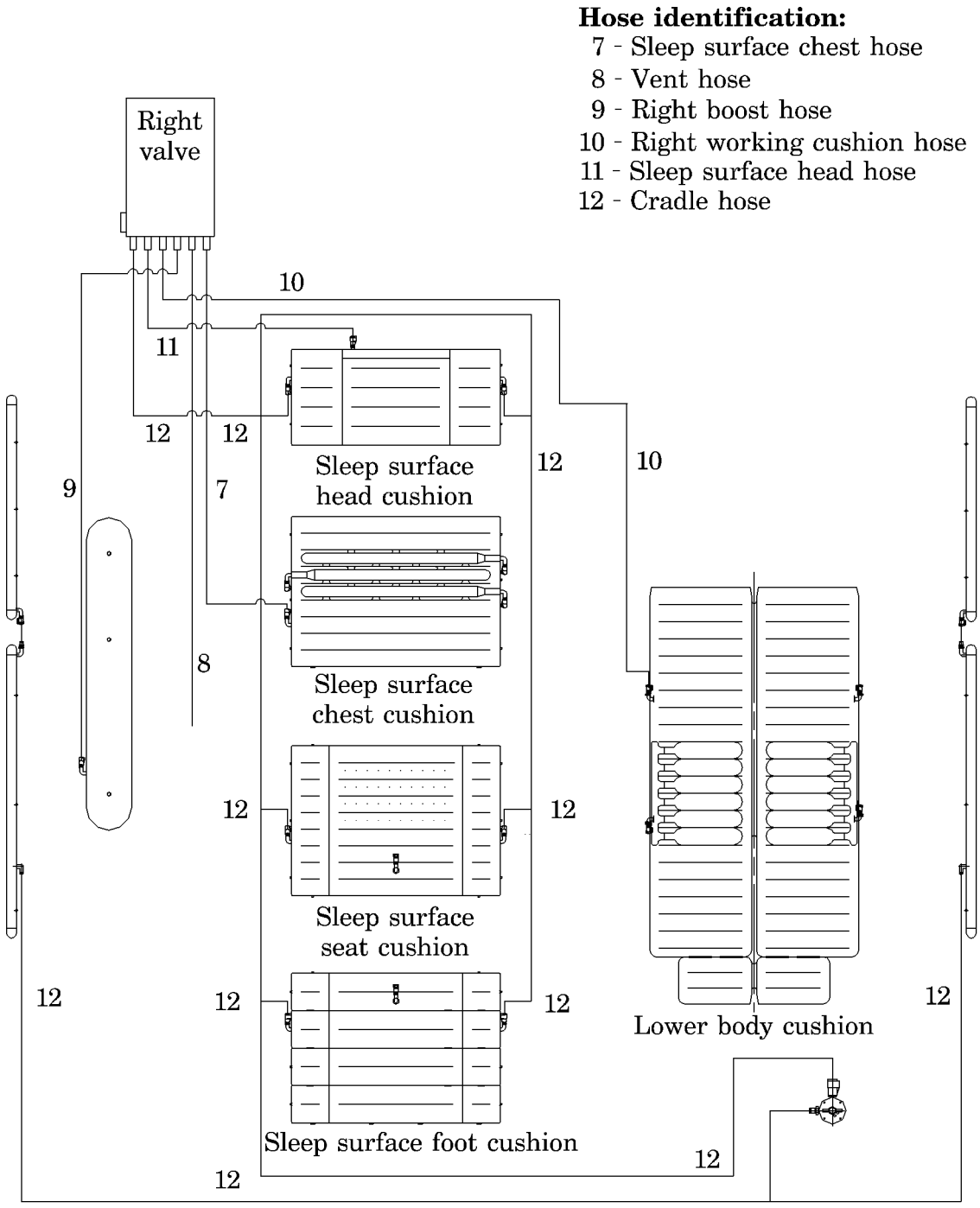
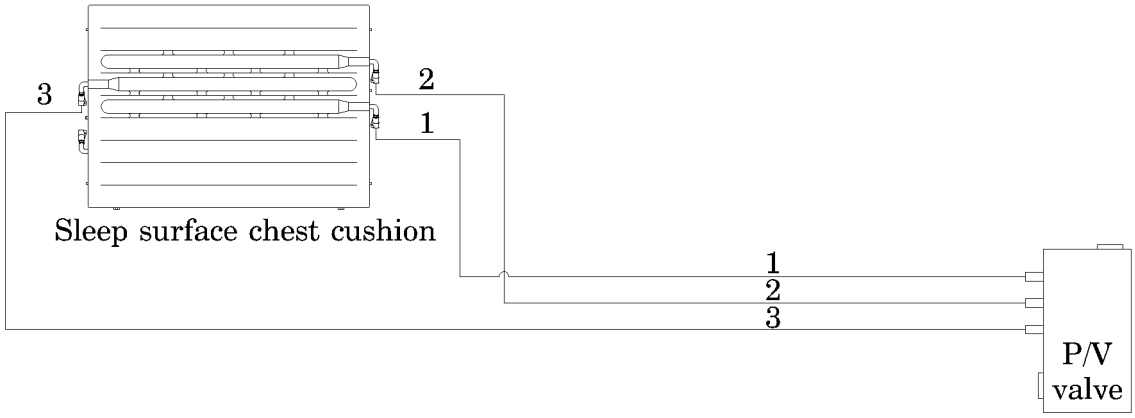


Figure 3-13. Percussion/Vibration Hose Routing Diagram

Hose identification:
1 - Short percussion/vibration (P/V) hose
2 - Medium P/V hose
3 - Long P/V hose



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Software

Program instructions for operations are contained in an EPROM in the control panel. Functions are accessed through a series of menus selected via the touch screen and control panel buttons. Figure 3-14 on page 3-20, figure 3-15 on page 3-21, figure 3-16 on page 3-22, and figure 3-17 on page 3-23 provide diagrams of the functional interactions.

Figure 3-14. Menu System Overview

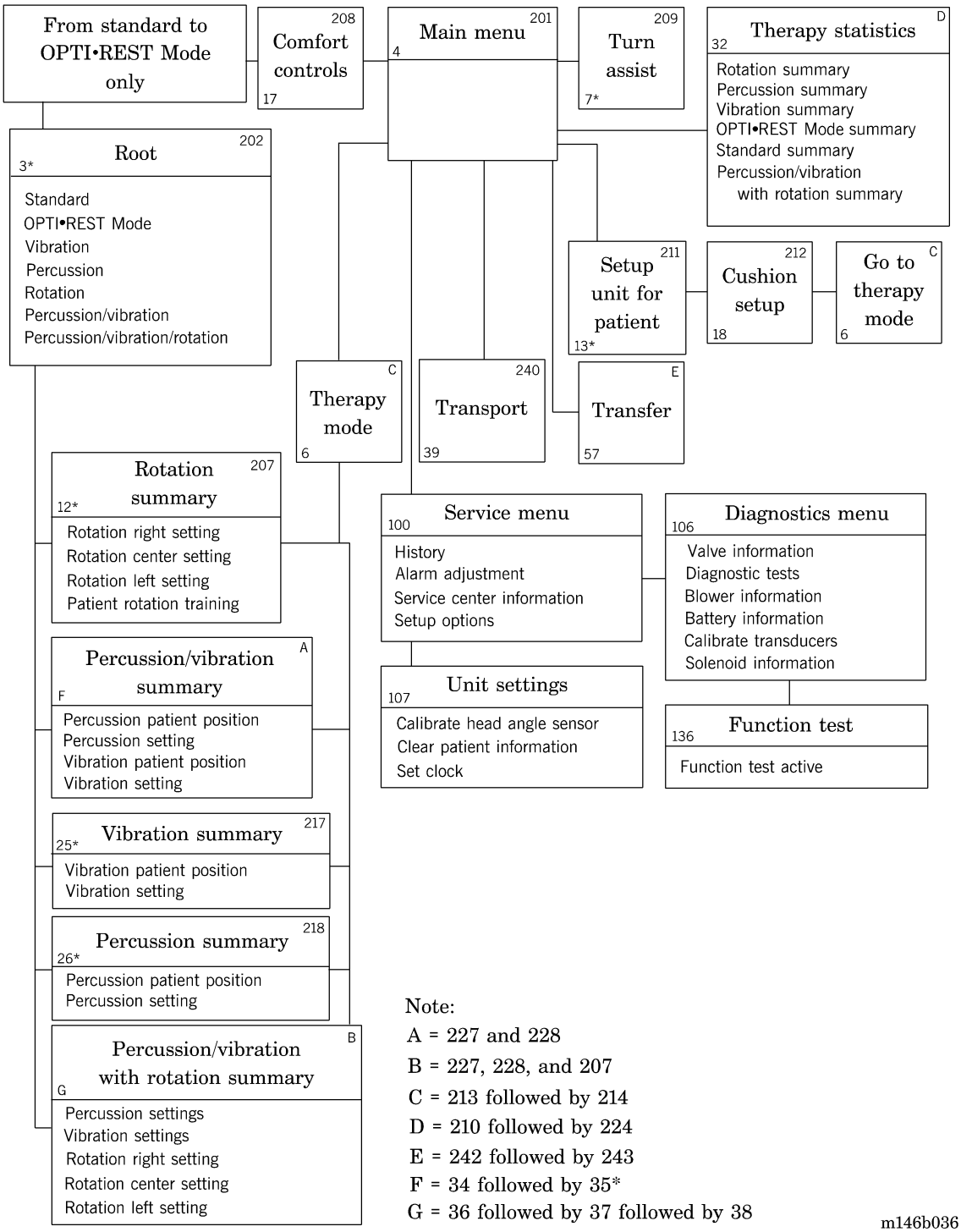

Figure 3-15. Service Menu and Diagnostic Menu Detail

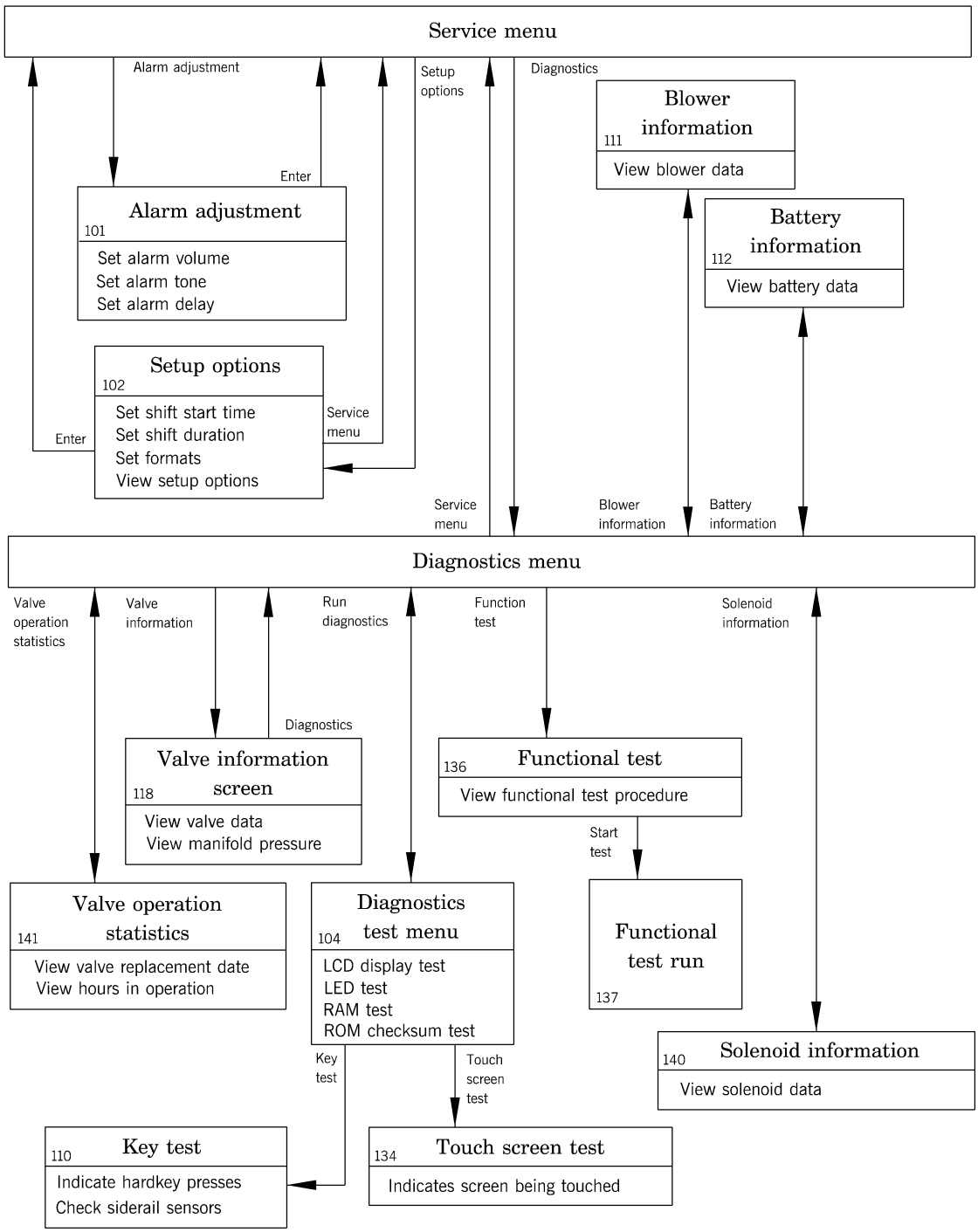

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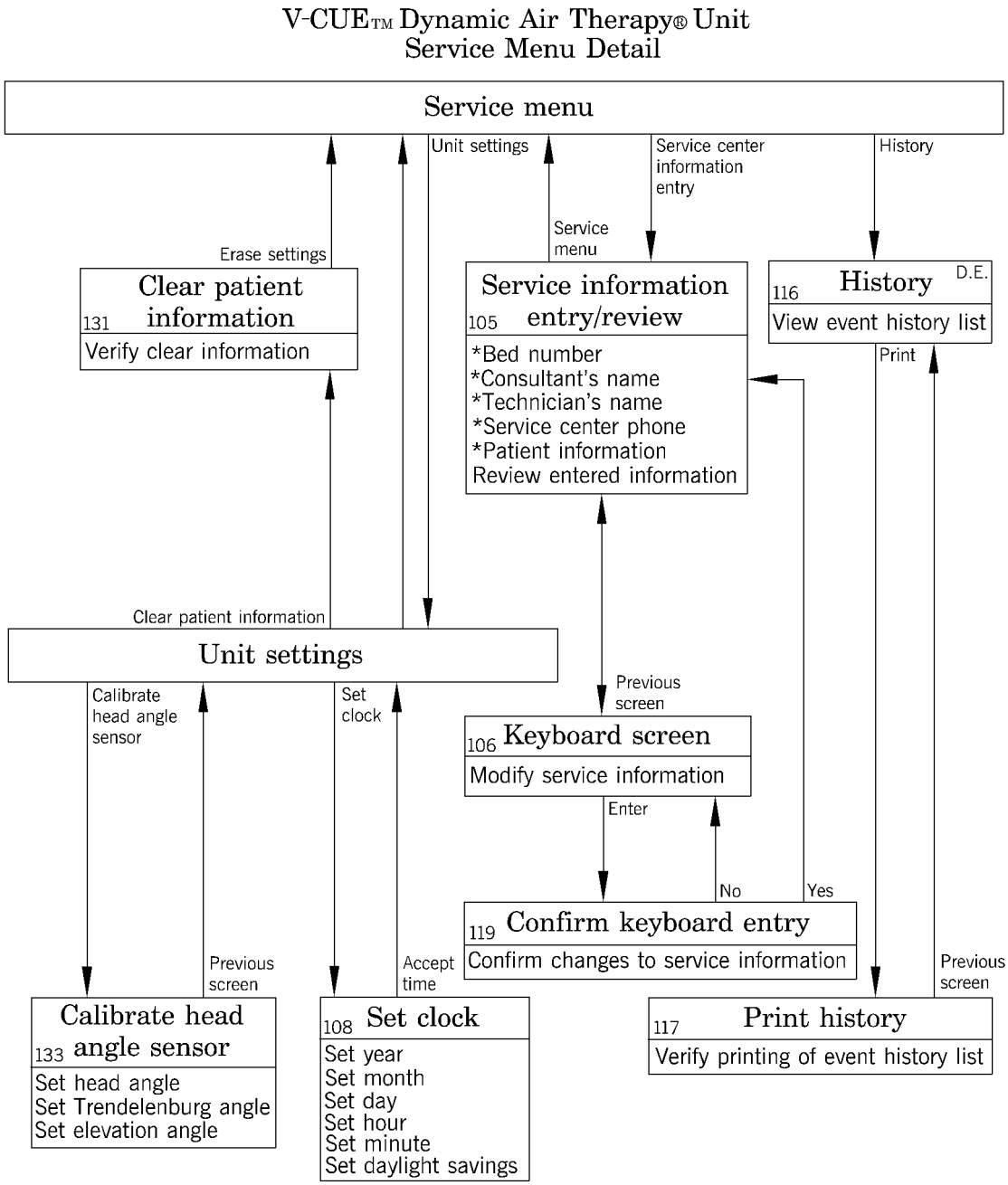
Figure 3-16. Service Menu and Unit Settings Detail



Note:
* = Pressing this button leads to the keyboard screen.
D.E. = Detail error help page

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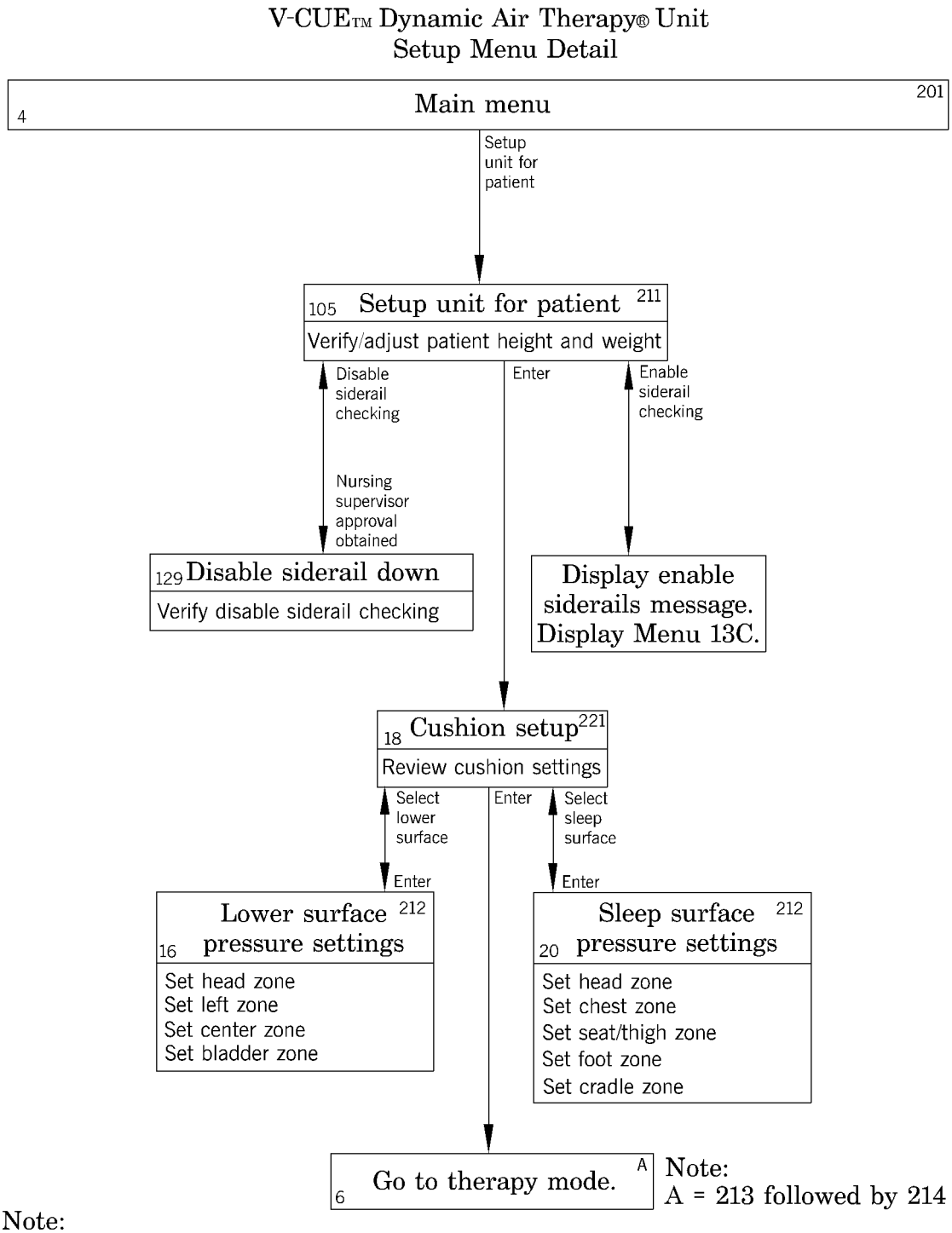
Figure 3-17. Setup Menu Detail



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Chapter 4
Removal, Replacement, and Adjustment Procedures

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4

NOTES:

4.1 Air Supply Unit Case

Tools required: Phillips head screwdriver

Removal

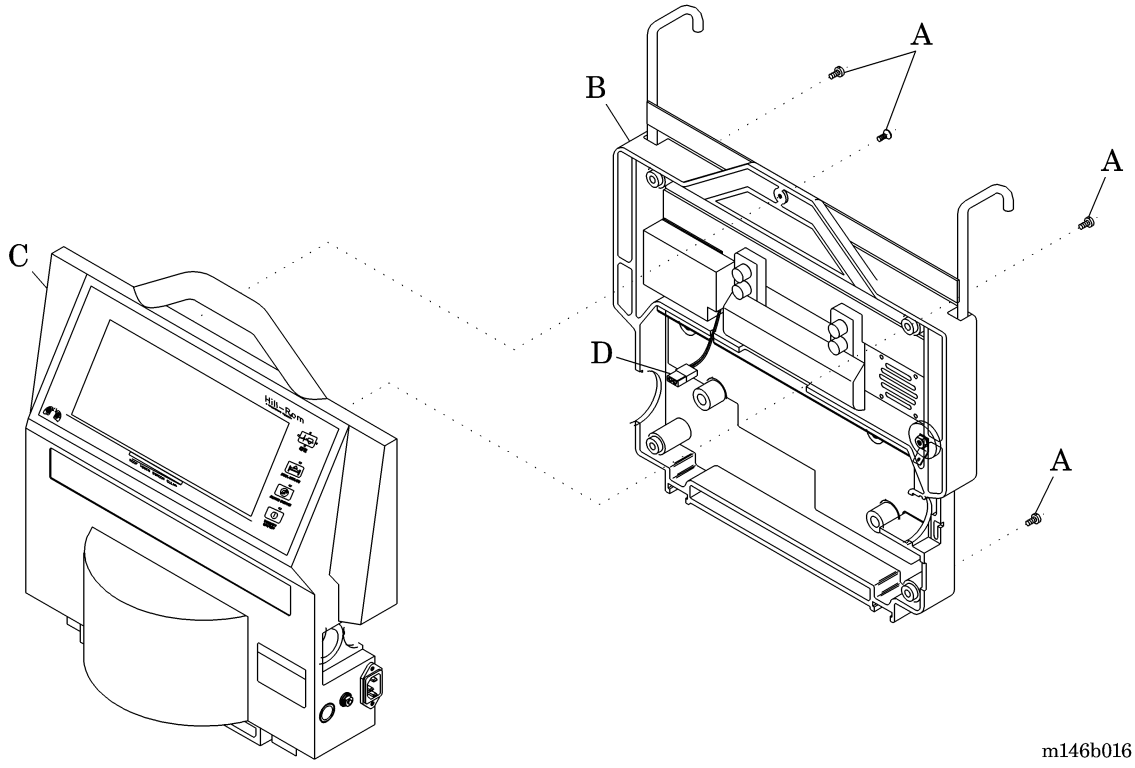
SHOCK HAZARD:
Voltage is present on exposed electrical connectors when power is on. Use care when working close to exposed connections. Failure to do so could result in personal injury or equipment damage.

SHOCK HAZARD:
Unplug the unit from its power source. Failure to do so could result in personal injury or equipment damage.

1. Unplug the unit from its power source.

2. Using a phillips head screwdriver, remove the five screws (A) that secure the rear case (B) to the front case (C) (see figure 4-1 on page 4-5).

Figure 4-1. Air Supply Unit Case



3. Carefully pull the rear case (B) from the front case (C).

4. If you are completely separating the front and rear sections of the case, disconnect the battery in-line connector (D), and slide off the biomed connector (ground) on the rear case (B).

SHOCK HAZARD:
Avoid touching the power supply, P.C. board, heat sink. When power is applied to the unit, contact with the power supply, P.C. board, heat sink could result in severe injury or death.

5. Ensure that the unit is unplugged from its power source, and avoid touching the power supply, P.C. board, heat sink.

Replacement

CAUTION:
Ensure proper cable routing. Failure to do so could result in equipment damage.

1. Perform the removal procedure in reverse order. Ensure proper cable routing.

2. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

4.2 Battery

Tools required: None

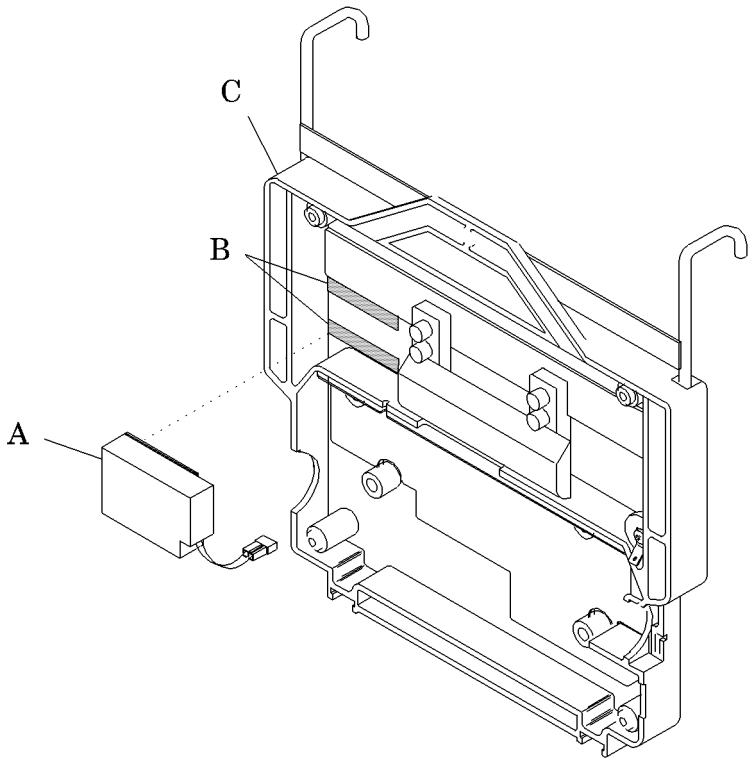
Removal

NOTE:
Do not remove the battery except to replace it. It is difficult to reattach.

1. Open the air supply unit case (refer to procedure 4.1).

2. Pull the sealed rechargeable battery (A) from the Dual Lock®[1] fasteners (B) that secure it to the rear case assembly (C) (see figure 4-2 on page 4-7).

Figure 4-2. Battery



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3. Disconnect, and remove the sealed rechargeable battery (A) from the rear case assembly (C).

4. Remove the Dual Lock® fasteners (B) from the rear case assembly (C).

1. Dual Lock® is a registered trademark of Minnesota Mining and Manufacturing Company.

Replacement

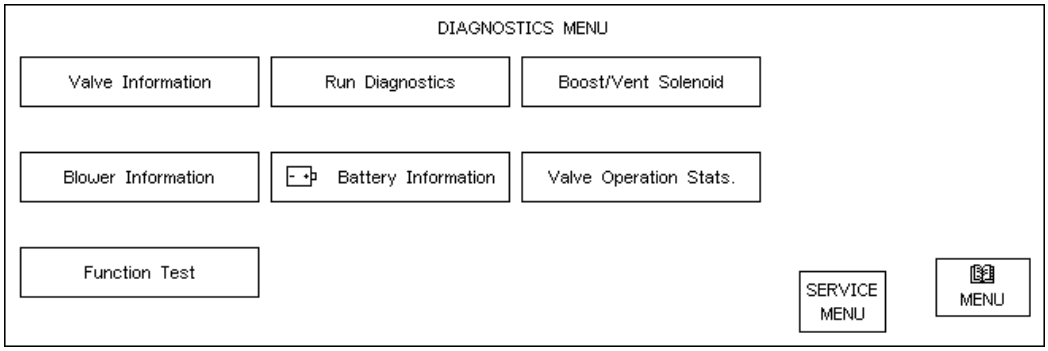
CAUTION:
Ensure proper cable routing. Failure to do so could result in equipment damage.

1. Perform the removal procedure in reverse order. Ensure proper cable routing.

2. Record the date on the Battery Information screen.

   a. Touch Diagnostics on the Service Options Menu screen. The Diagnostics Menu is displayed (see figure 4-3 on page 4-8).

Figure 4-3. Diagnostics Menu Screen



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   b. Touch Battery Information on the Diagnostics Menu. The Battery Information screen is displayed.

   c. Record the date on this screen.

3. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

4.3 Battery Charger P.C. Board

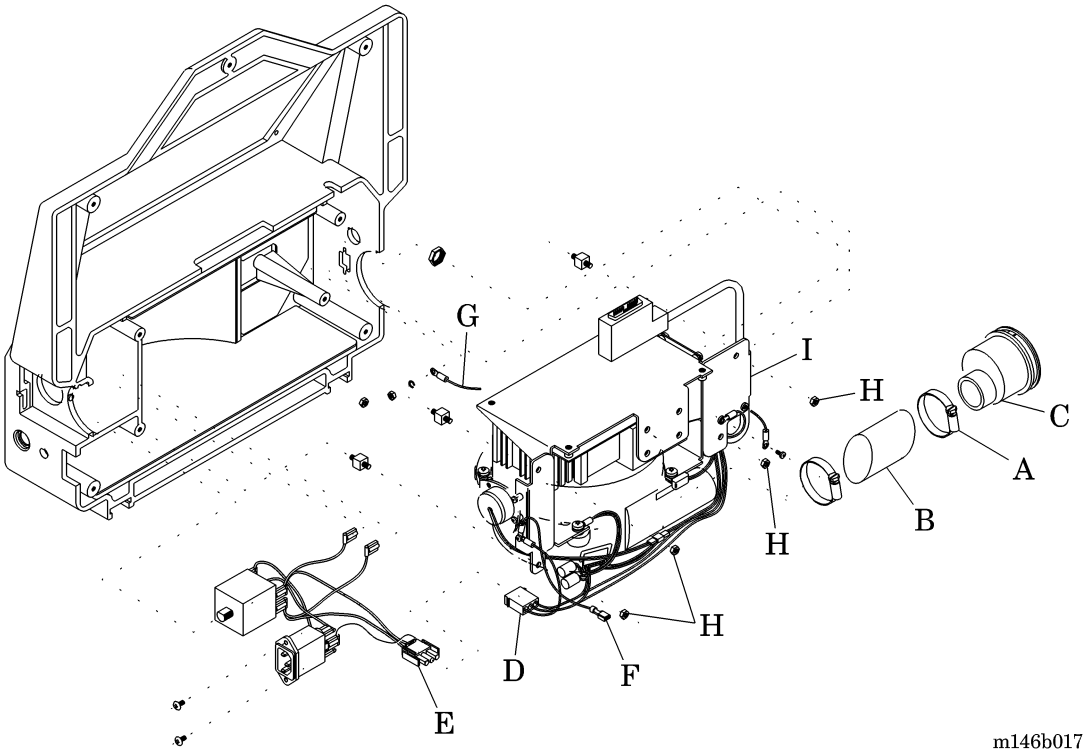
Tools required: Phillips head screwdriver
11/32" nut driver
Small screwdriver

Removal

1. Open the air supply unit case (refer to procedure 4.1).

2. Loosen the spring clamp (A) on the blower tube (B), and remove the blower tube (B) and outlet flange (C) (see figure 4-4 on page 4-9).

Figure 4-4. Blower Motor Bracket Removal



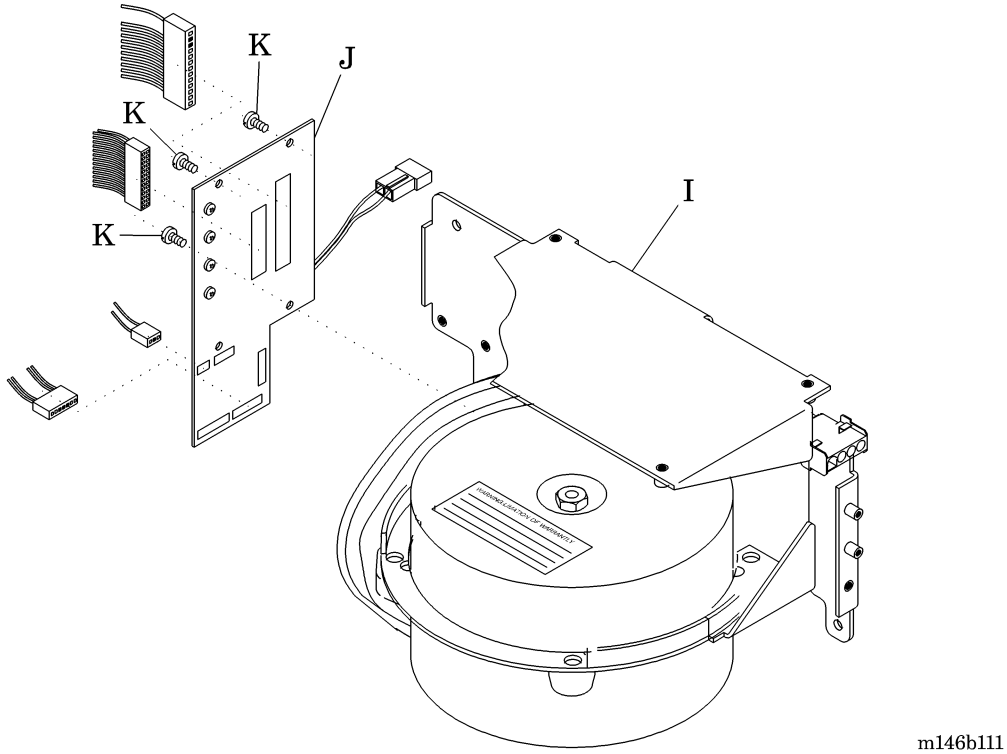
3. Disconnect the in-line connector (D) from the power inlet (E).

4. Using a phillips head screwdriver, remove the chassis ground wire (F) and the DB9 connector ground wire (G).

5. Using a 11/32" nut driver, remove the four nuts (H) that secure the blower bracket (I) to the front of the unit.

6. Slide the blower bracket (I) out for access to the battery charger P.C. board (J) connectors (see figure 4-5 on page 4-10).

Figure 4-5. Battery Charger P.C. Board



7. Disconnect all connectors on the battery charger P.C. board (J).

8. Using a small screwdriver, remove the screws (K) that secure the battery charger P.C. board (J) to the blower bracket (I).

Replacement

1. Perform the removal procedure in reverse order.

2. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

4.4 Beeper Cable Assembly

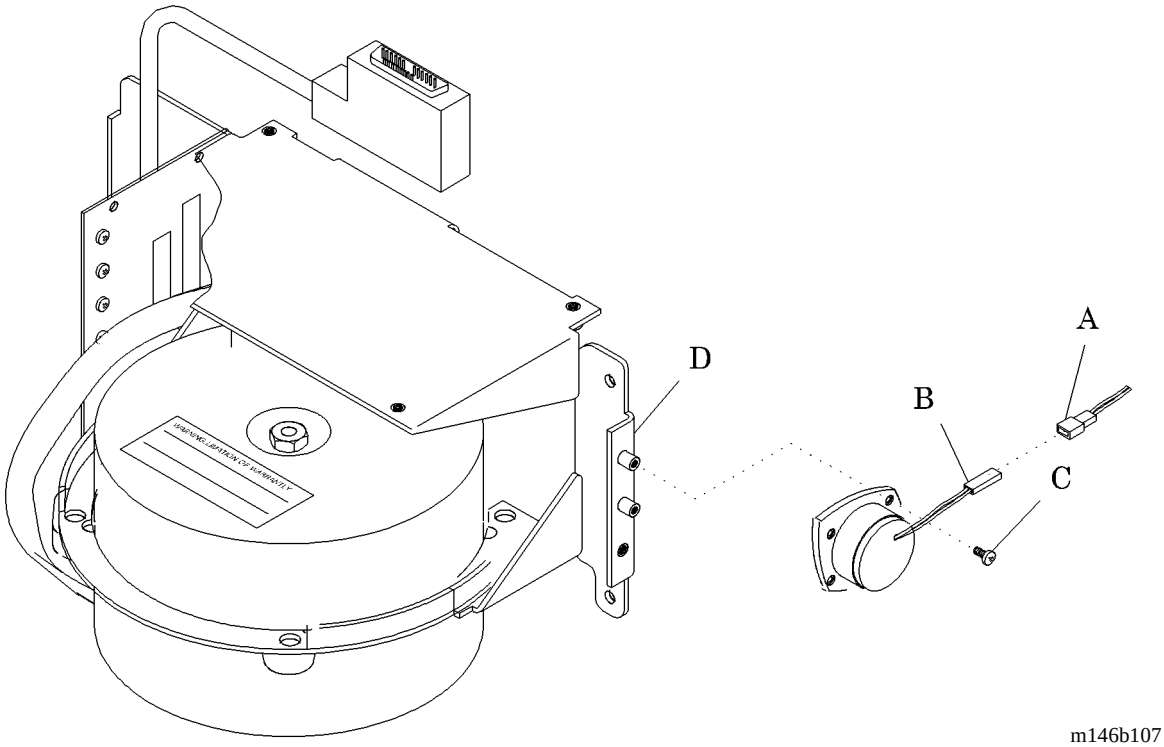
Tools required: Phillips head screwdriver

Removal

1. Open the air supply unit case (refer to procedure 4.1).

2. Disconnect the power entry/breaker assembly (A) from the beeper cable assembly (B) (see figure 4-6 on page 4-11).

Figure 4-6. Beeper Cable Assembly



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3. Using the phillips head screwdriver, remove the two pan head screws (C) that secure the beeper cable assembly (B) to the blower bracket (D).

4. Remove the beeper cable assembly (B) from the blower bracket (D).

Replacement

1. Perform the removal procedure in reverse order.

2. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

4.5 Blower Motor

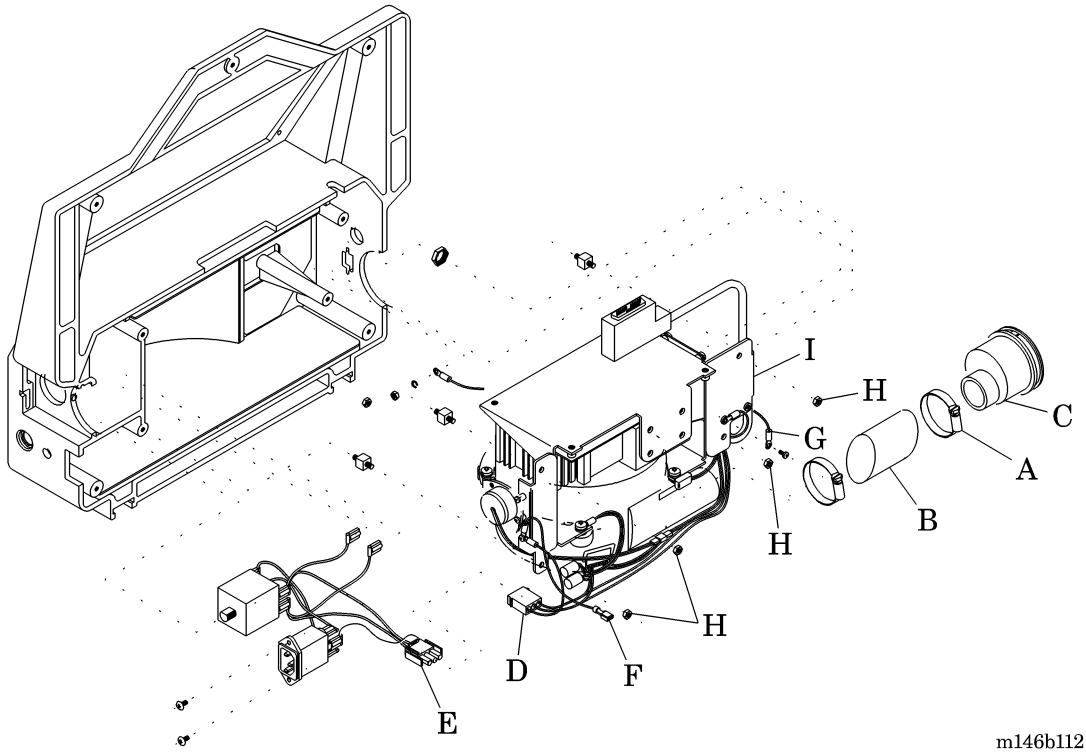
Tools required: Phillips head screwdriver
11/32" nut driver
Small screwdriver

Removal

1. Open the air supply unit case (refer to procedure 4.1).

2. Loosen the spring clamp (A) on the blower tube (B), and remove the blower tube (B) and outlet flange (C) (see figure 4-7 on page 4-12).

Figure 4-7. Blower Motor Bracket and Power Supply



3. Disconnect the in-line connector (D) from the power inlet (E).

4. Note the location of the chassis ground wire (F) and DB9 connector ground wire (G).

5. Remove the chassis ground wire (F) and the DB9 ground wire (G).

6. Using a 11/32" nut driver, remove the four nuts (H) that secure the blower bracket (I) to the front of the unit.

7. Disconnect the pins J7 and J8 (control panel extension harness) and the pin J3 (serial port harness) from the battery charger P.C. board (J) (see figure 4-8 on page 4-14).

8. Gently pull the blower bracket (I) away from the front cover, and disconnect the control panel cable assembly (K).

9. Using a phillips head screwdriver, remove the four screws (L) and eight shoulder washers (M) that secure the blower motor (N) to the blower bracket (I).

10. Remove the blower motor (N) from the blower bracket (I).

11. Using a small screwdriver, push in on the power entry/breaker assembly (O) connection, and disconnect it from the blower motor (N).

Replacement

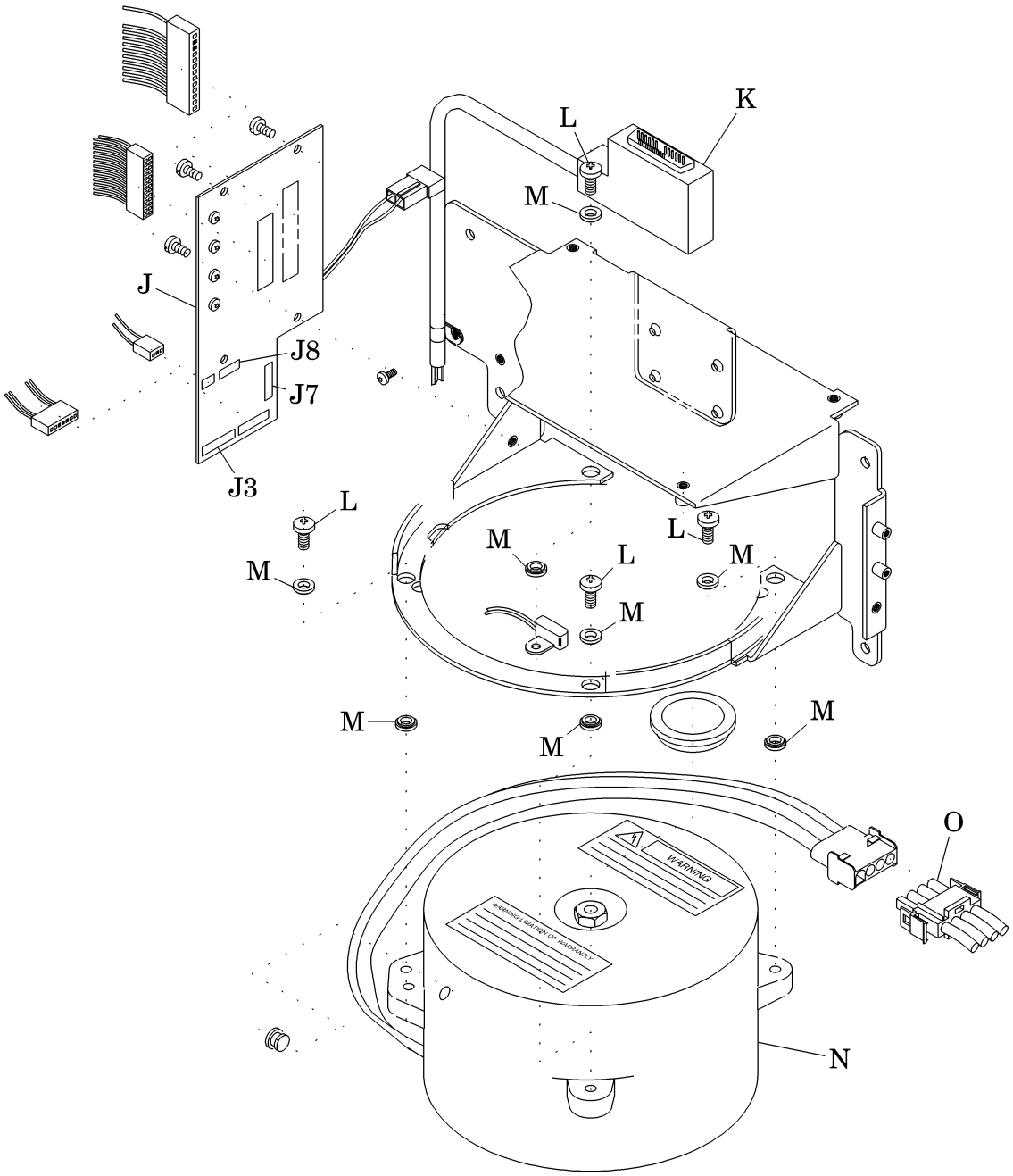
1. Perform the removal procedure in reverse order.

2. When replacing the chassis ground wire (F) and DB9 connector ground wire (G), ensure they are in the same position as when they were removed (see figure 4-7 on page 4-12).

3. Ensure no wires are pinched between the two halves of the air supply unit case.

4. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

Figure 4-8. Blower Motor



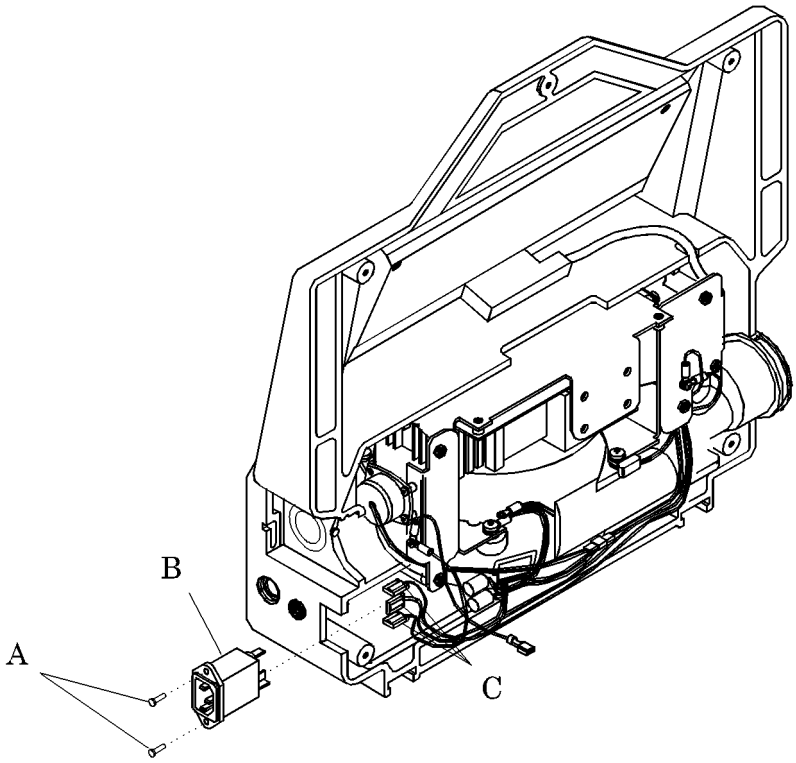
4.6 Power Cord Receptacle

Tools required: Phillips head screwdriver
Needle nose pliers

Removal

1. Using a phillips head screwdriver, remove the two screws (A) that secure the power cord receptacle (B) to the side of the air supply unit (see figure 4-9 on page 4-15).

Figure 4-9. Power Cord Receptacle



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2. Carefully pull the power cord receptacle (B) out of the unit until the blade connectors (C) are exposed.

3. Using needle nose pliers, disconnect the three blade connectors (C) from the power cord receptacle (B).

Replacement

1. Perform the removal procedure in reverse order.

2. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

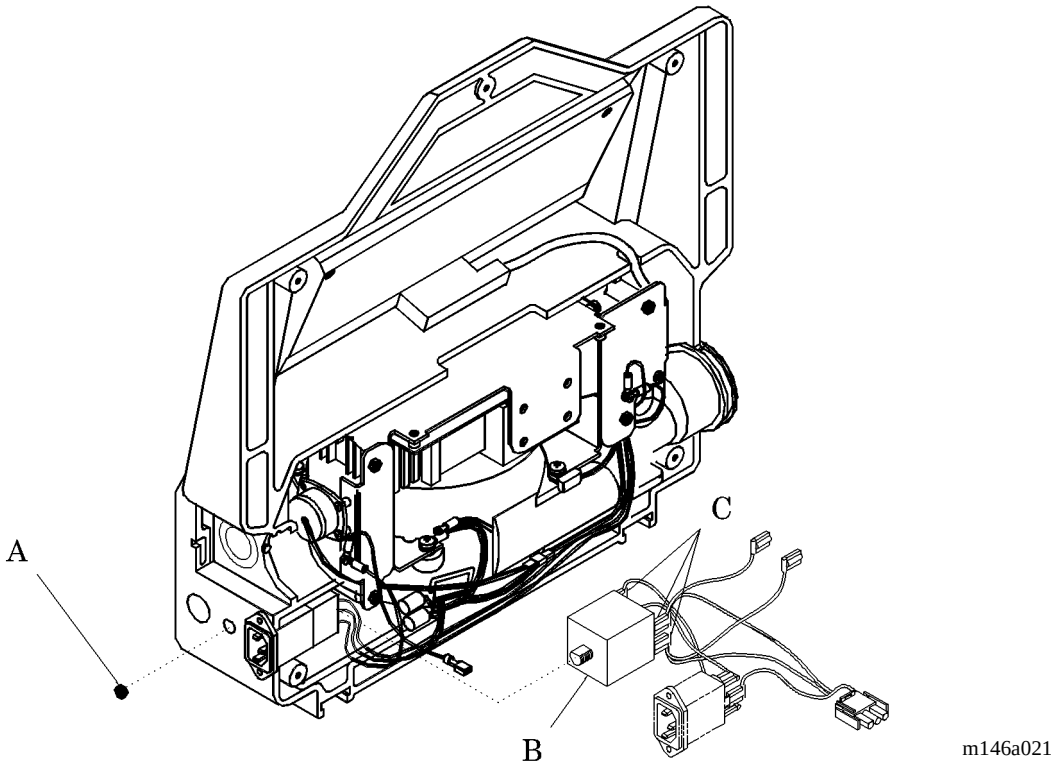
4.7 Circuit Breaker Assembly

Tools required: 5/16" wrench

Removal

1. Open the air supply unit case (refer to procedure 4.1).
2. Remove the power cord receptacle (refer to procedure 4.6).
3. Using a 5/16" wrench, remove the nut (A) that secures the circuit breaker assembly (B) to the side of the unit (see figure 4-10 on page 4-17).

Figure 4-10. Circuit Breaker Assembly



4. Carefully pull the circuit breaker assembly (B) straight back out of the hole and out through the inside of the unit.
5. Remove the four blade connectors (C) from the circuit breaker assembly (B).

Replacement

1. Perform the removal procedure in reverse order.

2. When inserting the new circuit breaker assembly (B), slide it straight into the case, and then into the hole.

3. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

4.8 Control Panel

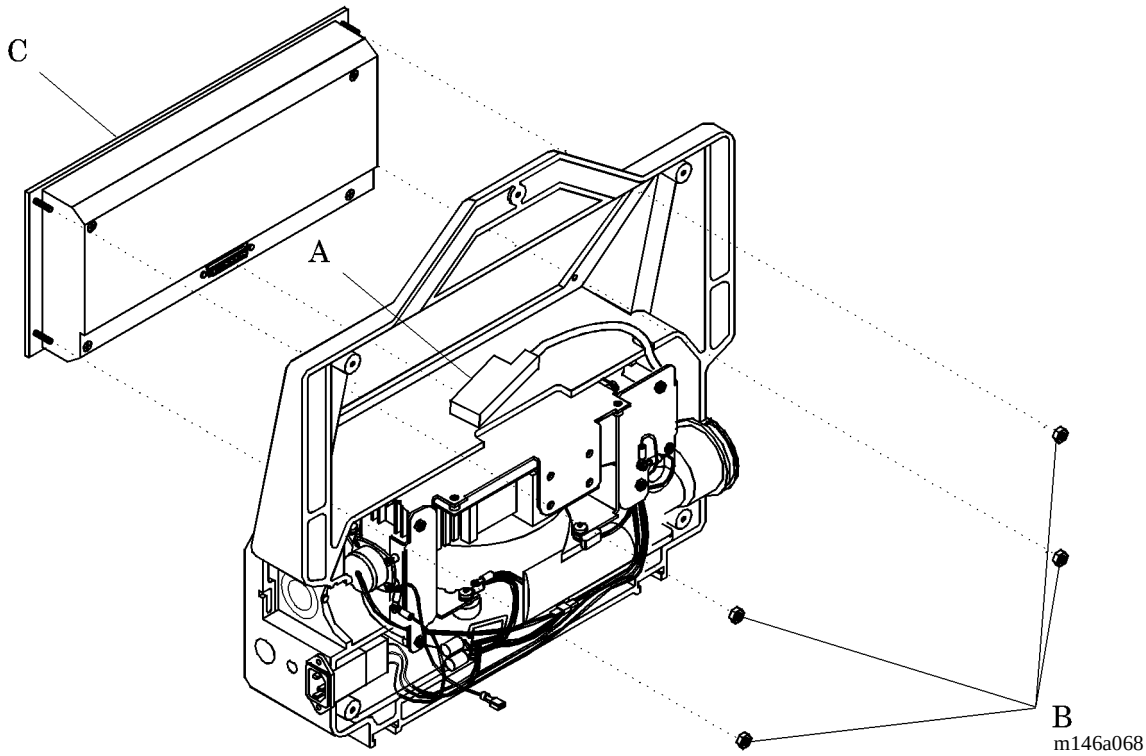
Tools required: 6/32" nut driver

Removal

1. Open the air supply unit case (refer to procedure 4.1).

2. Disconnect the control panel harness connector (A) (see figure 4-11 on page 4-19).

Figure 4-11. Control Panel Removal



3. Using a 6/32" nut driver, remove the four nuts (B) that secure the control panel (C) to the front case.

4. Slide the control panel (C) out through the front of the case.

Replacement

1. Perform the removal procedure in reverse order.

2. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

4.9 Control Panel Bezel Assembly

Tools required: Phillips head screwdriver
Antistatic strap

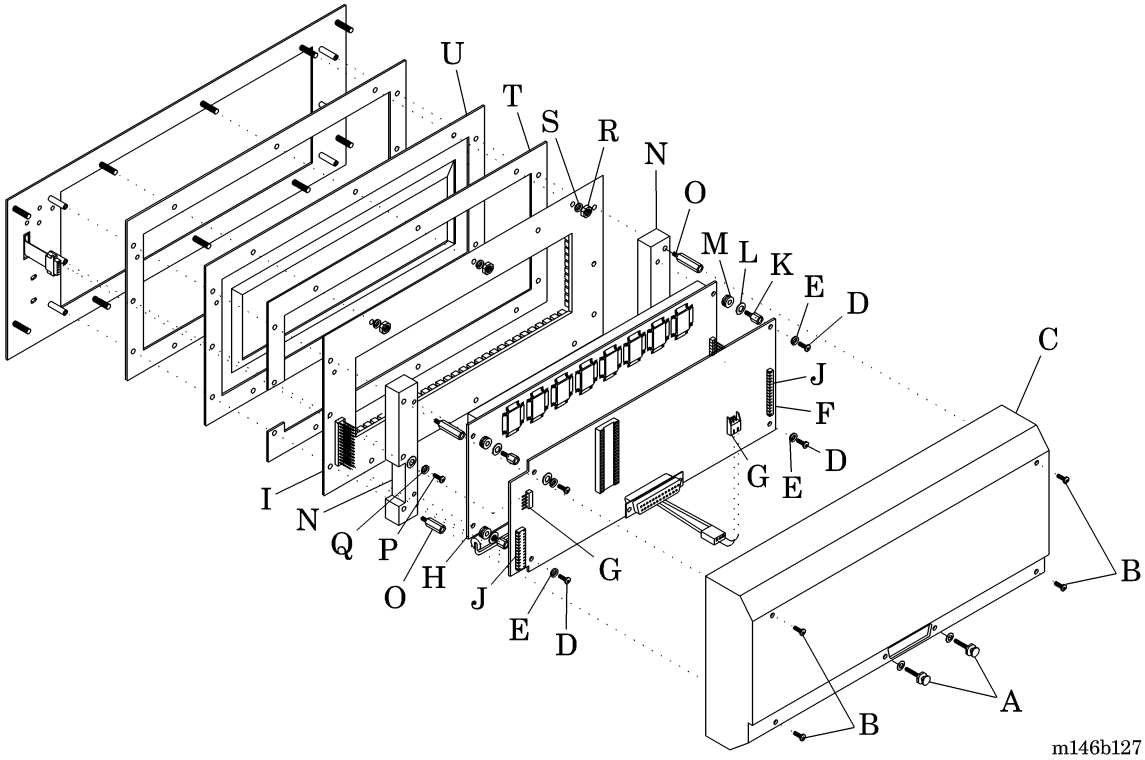
Removal

1. Open the air supply unit case (refer to procedure 4.1).

2. Remove the control panel (refer to procedure 4.8).

3. Using a phillips head screwdriver, remove the two slide latch locking posts (A) and the four screws (B) that secure the control panel cover (C) to the control panel (see figure 4-12 on page 4-20).

Figure 4-12. Control Panel Bezel



4. Remove the control panel cover (C).

5. Using the phillips head screwdriver, remove the four screws (D) and four split lockwashers (E) that secure the control panel display P.C. board (F) to the control panel (see “Component Handling” on page 6-6).

6. Disconnect the two connections (G) on the control panel display P.C. board (F).

CAUTION:
Use caution when removing the control panel display P.C. board from the LCD display and the touch screen P.C. board. Failure to do so could result in equipment damage.

7. Carefully remove the control panel display P.C. board (F) from the LCD display (H) and the touch screen P.C. board (I). Do not damage the connectors (J).

8. Remove the four jack screws (K), four flat washers (L), and four grommets (M) that secure the LCD display (H) to the two LCD mounting rails (N).

9. Remove the LCD display (H) from the two LCD mounting rails (N).

10. Remove the four standoffs (O) from the two LCD mounting rails (N).

11. Using the phillips head screwdriver, remove the two screws (P) and two split lockwashers (Q) that secure the two LCD mounting rails (N) to the touch screen P.C. board (I).

12. Remove the two LCD mounting rails (N) from the touch screen P.C. board (I).

13. Remove the six nuts (R) and six split lockwashers (S) that secure the touch screen P.C. board (I) to the control panel.

14. Remove the touch screen P.C. board (I) from the control panel.

15. Remove the sensor P.C. board spacer (T) from the control panel bezel assembly (U).

16. Remove the control panel bezel assembly (U) from the control panel.

Replacement

NOTE:
To ease installation of the control panel display P.C. board, line up and connect the connection from it to the touch screen P.C. board, and then the connection from it to the LCD display.

1. Perform the removal procedure in reverse order.

2. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

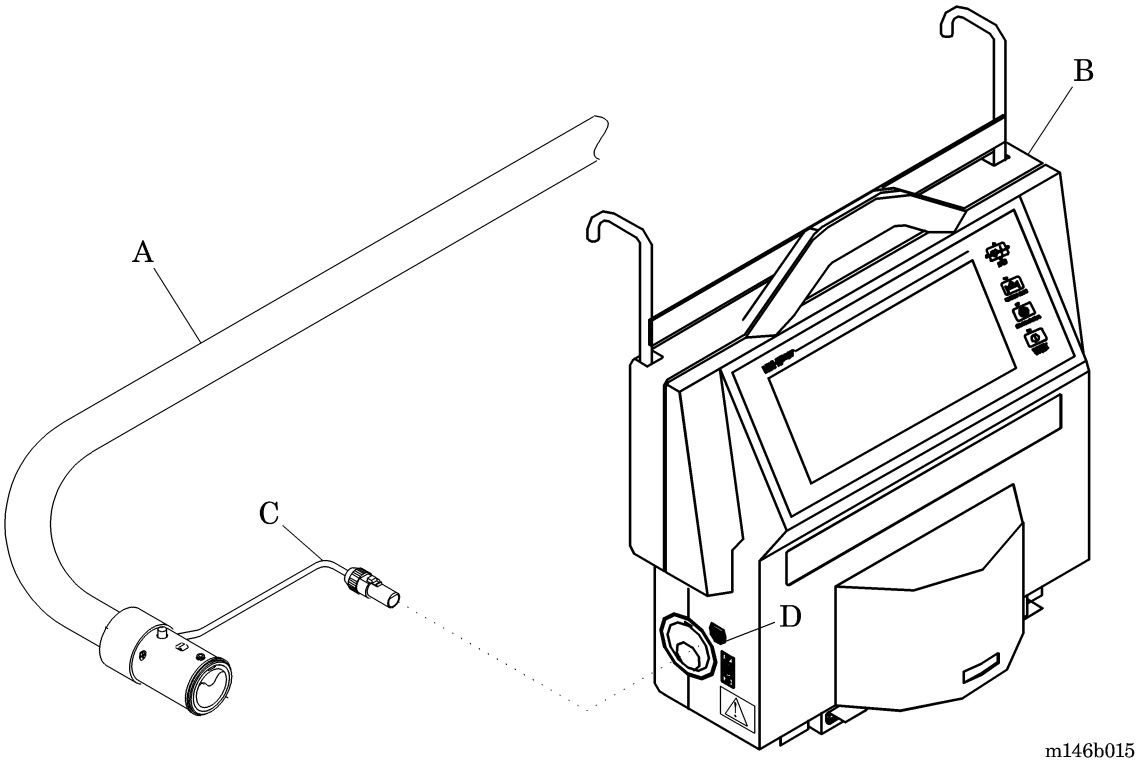
4.10 Control Panel Extension Cable Receptacle

Tools required: Phillips head screwdriver
7/16" wrench

Removal

1. Disconnect the air hose (A) from the air supply unit (B) (see figure 4-13 on page 4-22).

Figure 4-13. Cable and Receptacle

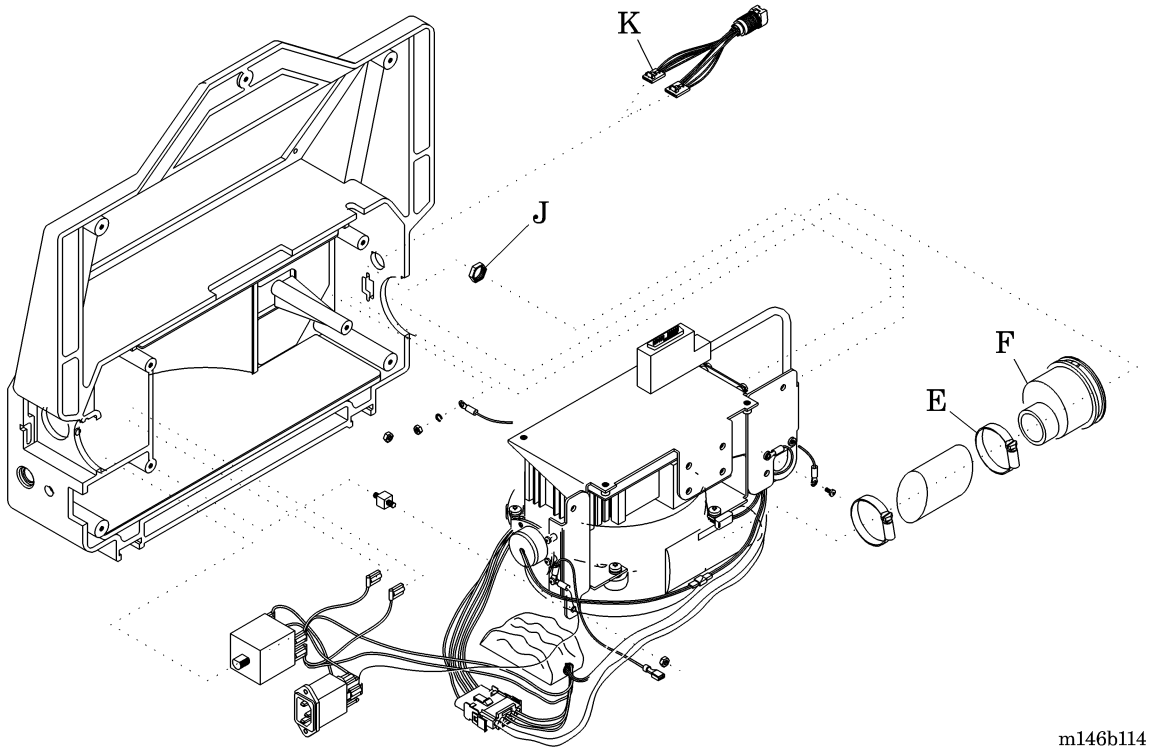


2. Disconnect the air supply cable (C) from the receptacle (D).

3. Open the air supply unit (B) (refer to procedure 4.1).

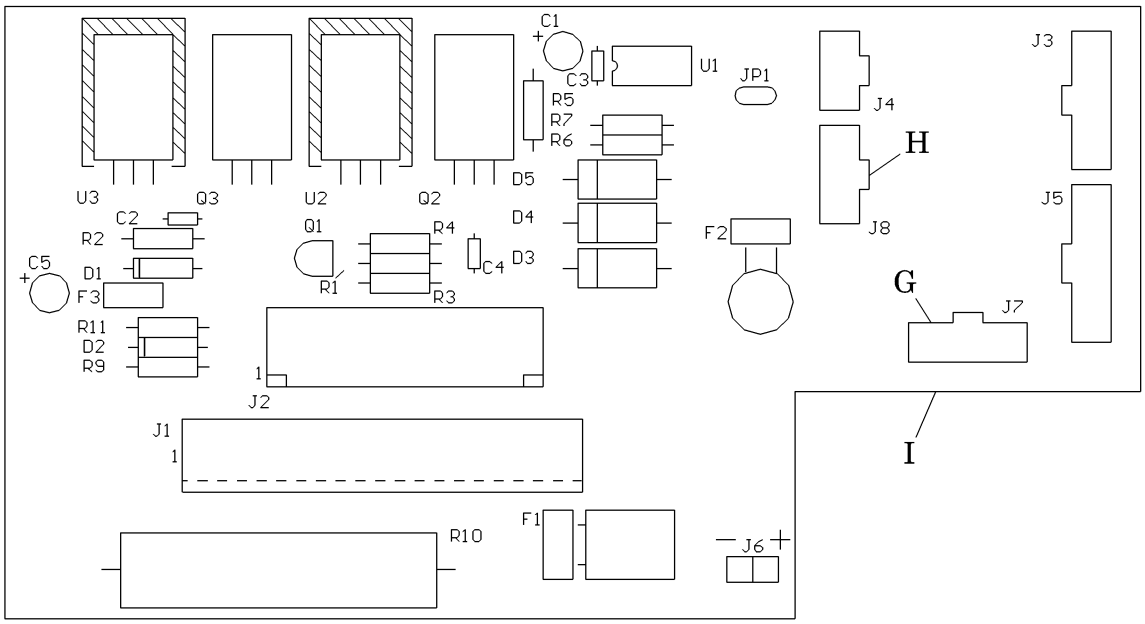
4. Remove the hose clamp (E) and outlet flange (F) (see figure 4-14 on page 4-23).

Figure 4-14. Front Case Assembly



5. Disconnect the pins J7 (G) and J8 (H) from the battery charger P.C. board (I) (see figure 4-15 on page 4-24).

Figure 4-15. Wire Harness Connections



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6. Using a 7/16" wrench, remove the nut (J) from the back of the control panel, extension cable receptacle (K) (see figure 4-14 on page 4-23).

7. Carefully twist and then pull the control panel, extension cable receptacle (K) through the side of the case.

Replacement

1. Perform the removal procedure in reverse order.

2. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

4.11 Control Panel EPROM

Tools required: Phillips head screwdriver
Antistatic wrist strap

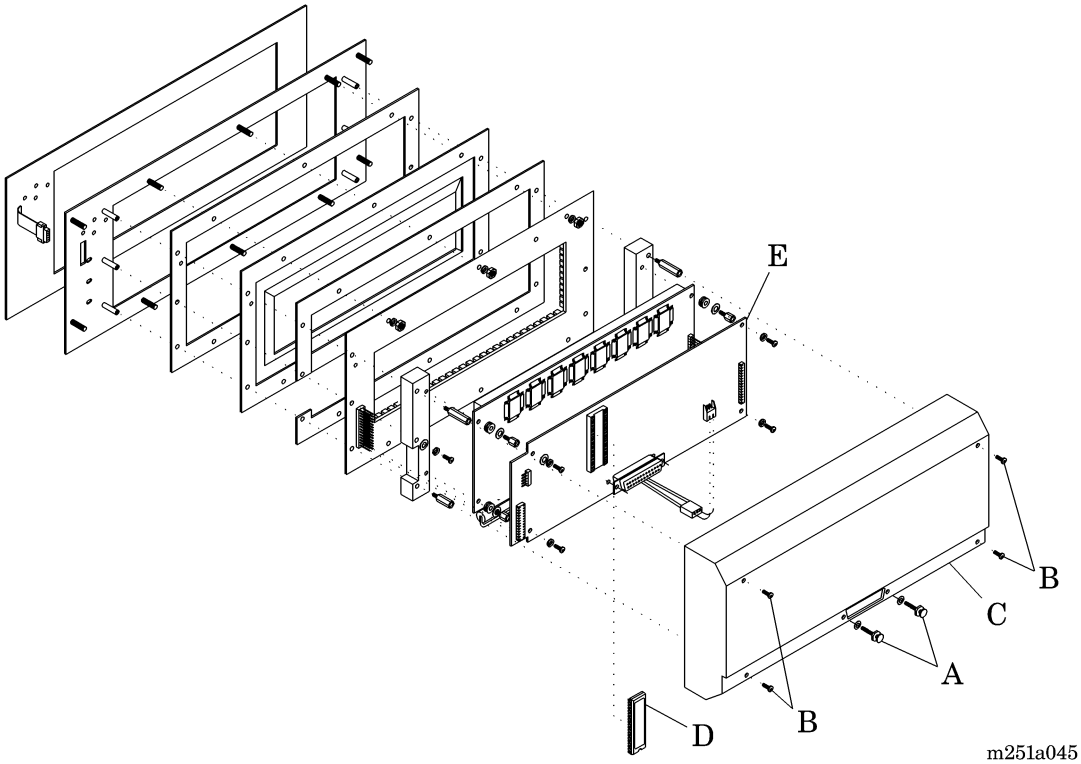
Removal

1. Open the air supply unit case (refer to procedure 4.1).

2. Remove the control panel (refer to procedure 4.8).

3. Using a phillips head screwdriver, remove the two slide latch locking posts (A) and the four screws (B) that secure the control panel cover (C) to the control panel (see figure 4-16 on page 4-25).

Figure 4-16. Control Panel EPROM



4. Remove the control panel cover (C).

CAUTION:
When handling electronic components, wear an antistatic strap. Failure to do so could result in component damage.

5. Put on an antistatic wrist strap, and earth it to the case (see "Component Handling" on page 6-6).

CAUTION:
Do not touch the EPROM pins. The pins can be damaged or misaligned, jeopardizing the connection.

6. Without touching the EPROM pins, remove the EPROM (D) from the LCD screen, P.C. board (E).

Replacement

CAUTION:
Ensure all the EPROM pins are securely in the sockets and the notch faces the LCD screen, P.C. board, bottom end. Failure to do so could result in equipment damage.

1. Insert the new EPROM (D) into the LCD screen, P.C. board (E). Ensure the notch on the EPROM (D) is facing the LCD screen, P.C. board (E), bottom end.

2. Perform the removal procedure in reverse order.

3. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the "Function Checks" on page 2-4.

4.12 On/Off Indicator Lamp

Tools required: Needle nose pliers

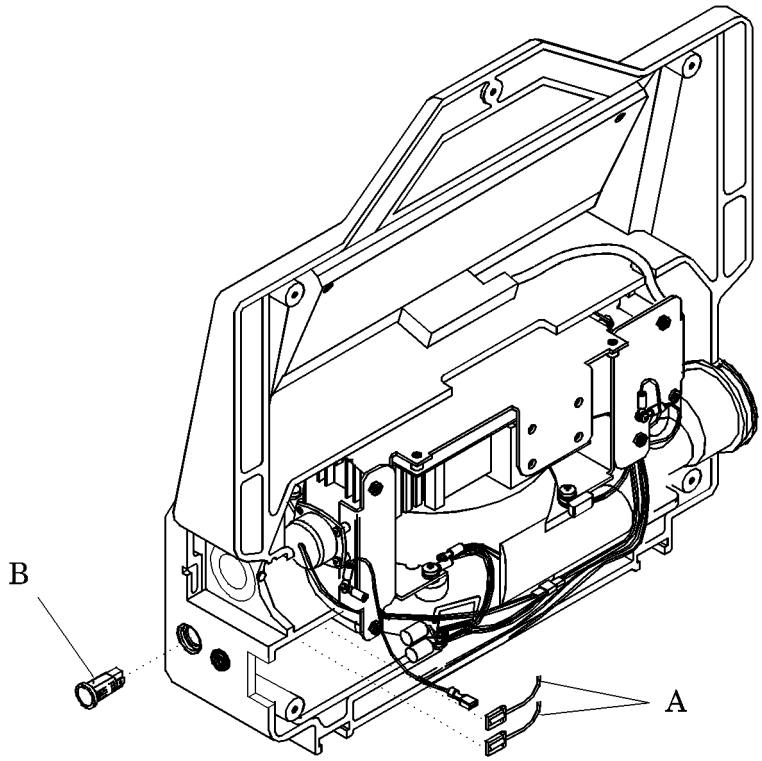
Removal

1. Open the air supply unit case (refer to procedure 4.1).

2. Remove the power cord receptacle (refer to procedure 4.6) and circuit breaker assembly (refer to procedure 4.7).

3. Using needle nose pliers, disconnect the two blade connectors (A) (see figure 4-17 on page 4-27).

Figure 4-17. Blade Connector



4. Carefully pull the on/off indicator lamp (B) through the side of the case.

Replacement

1. Perform the removal procedure in reverse order.

2. Connect the two blade connectors (A) to the on/off indicator lamp (B) before installing the circuit breaker assembly.

3. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

4.13 Printer Port Connector

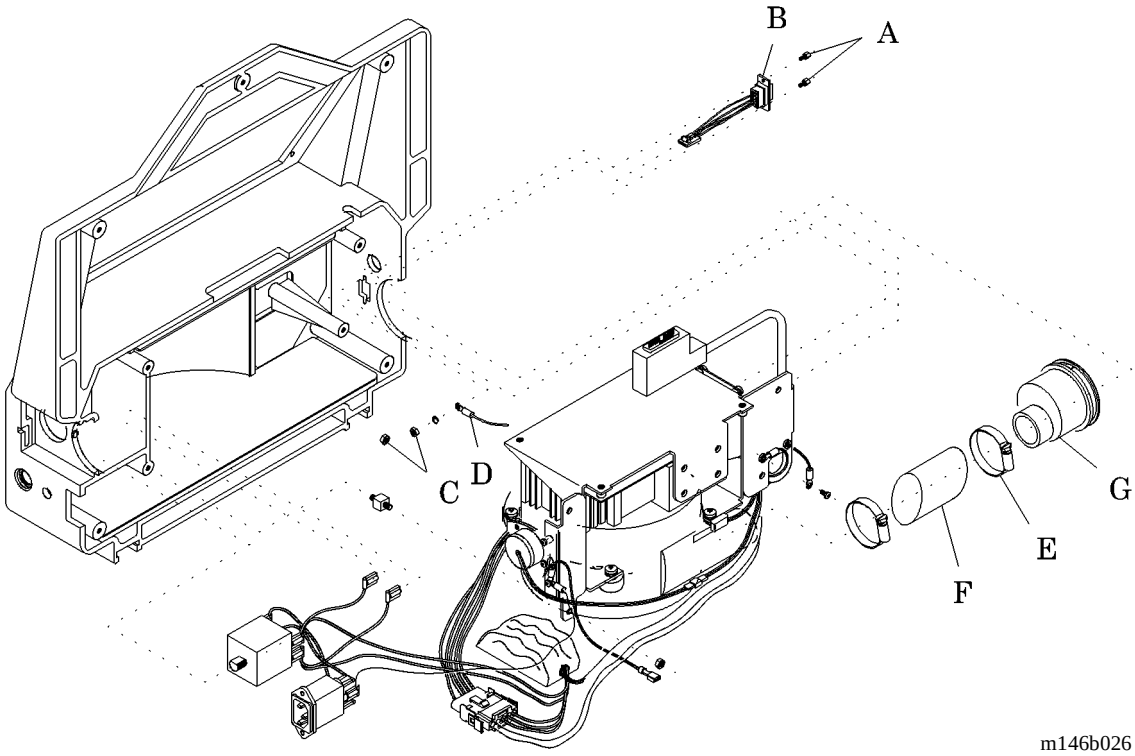
Tools required: Phillips head screwdriver
3/16" nut driver

Removal

1. Open the air supply unit case (refer to procedure 4.1).

2. Loosen the hose clamp (E) on the blower tube (F), and remove the blower tube (F) and outlet flange (G) (see figure 4-18 on page 4-29).

Figure 4-18. Printer Port Connector



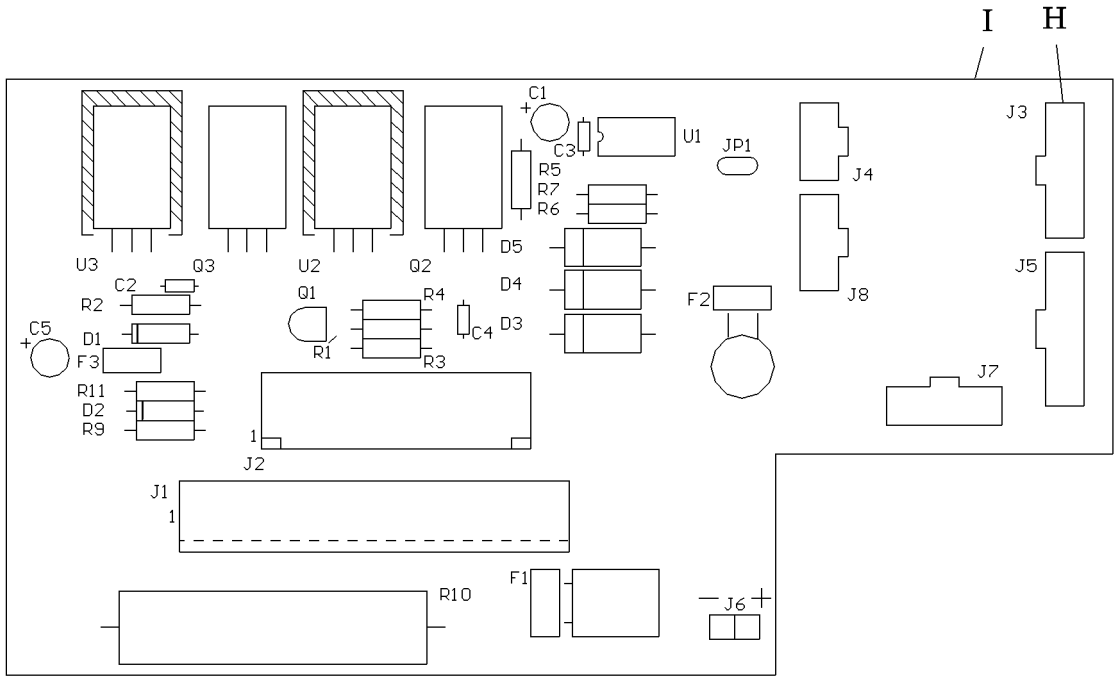
3. Using a phillips head screwdriver, remove the two nut screws (A) that secure the printer port (B) on the side of the unit.

4. Using a 3/16" nut driver, remove the two nuts (C) that secure the DB9 connector ground wire (D) on the inside of the unit.

5. Remove the DB9 connector ground wire (D).

6. Disconnect J3 (H) from the battery charger P.C. board (I) (see figure 4-19 on page 4-30).

Figure 4-19. Battery Charger P.C. Board



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7. Pull the printer port (B) through the inside of the unit (see figure 4-18 on page 4-29).

Replacement

1. Perform the removal procedure in reverse order.

2. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

4.14 Proportional Valve Assembly (Head Left/Head Right)

Tools required: Small screwdriver
7/64" Allen™[1] wrench

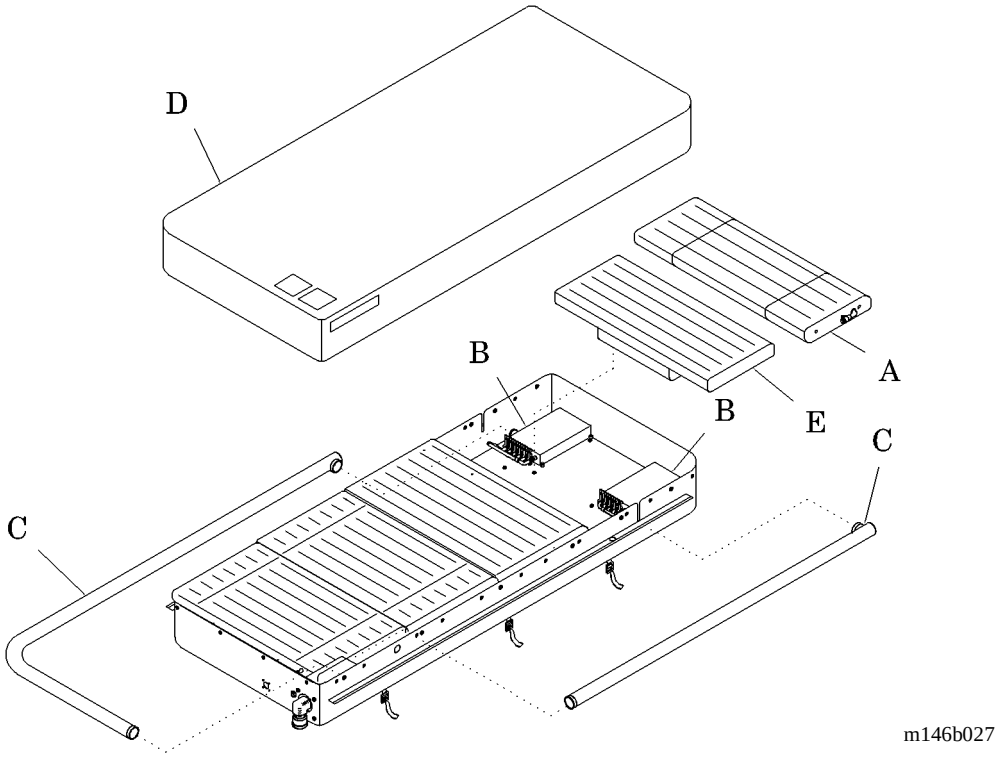
NOTE:
Only authorized personnel should access the interior of the mattress assembly.

Removal

1. If a patient is on the unit, slide him or her to the left or right depending on which valve assembly is being replaced.

2. Unzip the coverlet (D) (see figure 4-20 on page 4-31).

Figure 4-20. Air Cushions



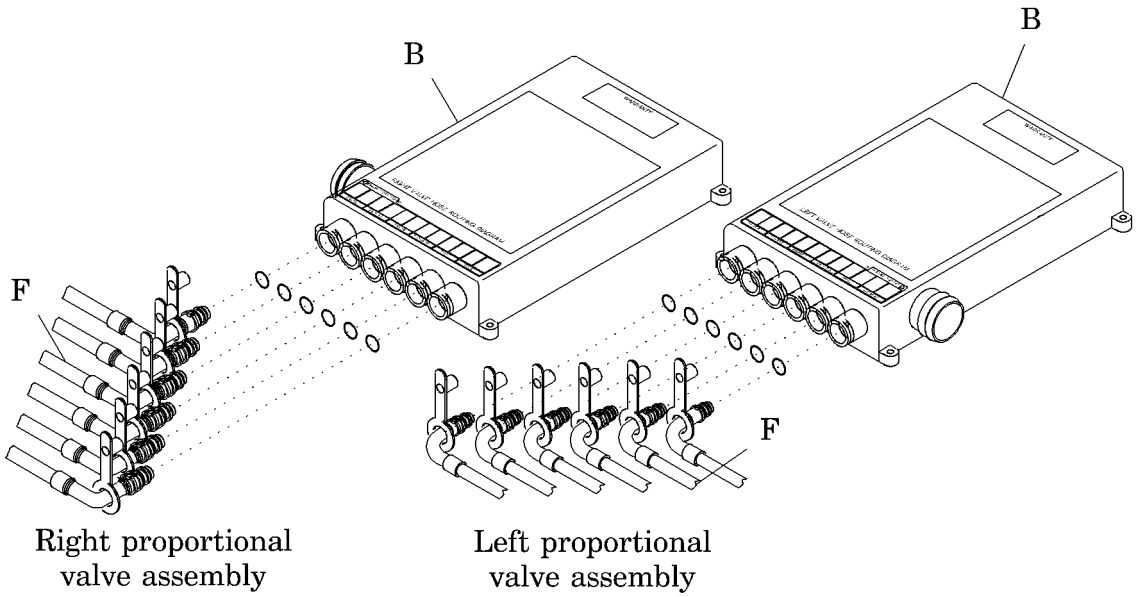
3. Unsnap the sleep surface head cushion (A).

4. Pull the corners of the lower head cushions (E) back, and expose the proportional valve assembly (B).

1. Allen™ is a trademark of Industrial Fasteners, Inc.

5. Disconnect the head, working cushion, air supply hose (F) from the proportional valve assembly (B) (see figure 4-21 on page 4-32).

Figure 4-21. Head, Working Cushion, Air Supply Hose



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6. Fold the lower head cushion (E) back under the sleep surface head cushion (A) (see figure 4-20 on page 4-31).

7. Disconnect all air hoses from the proportional valve assembly (B), and install the hose plugs.

8. Pull off the tube (C) from the proportional valve assembly (B).

9. With a proportional valve assembly (B) model that has an LED window, perform the following:

   a. Using a 7/64" Allen™[1] wrench, remove the two setscrews that secure the cover to the proportional valve assembly (B).

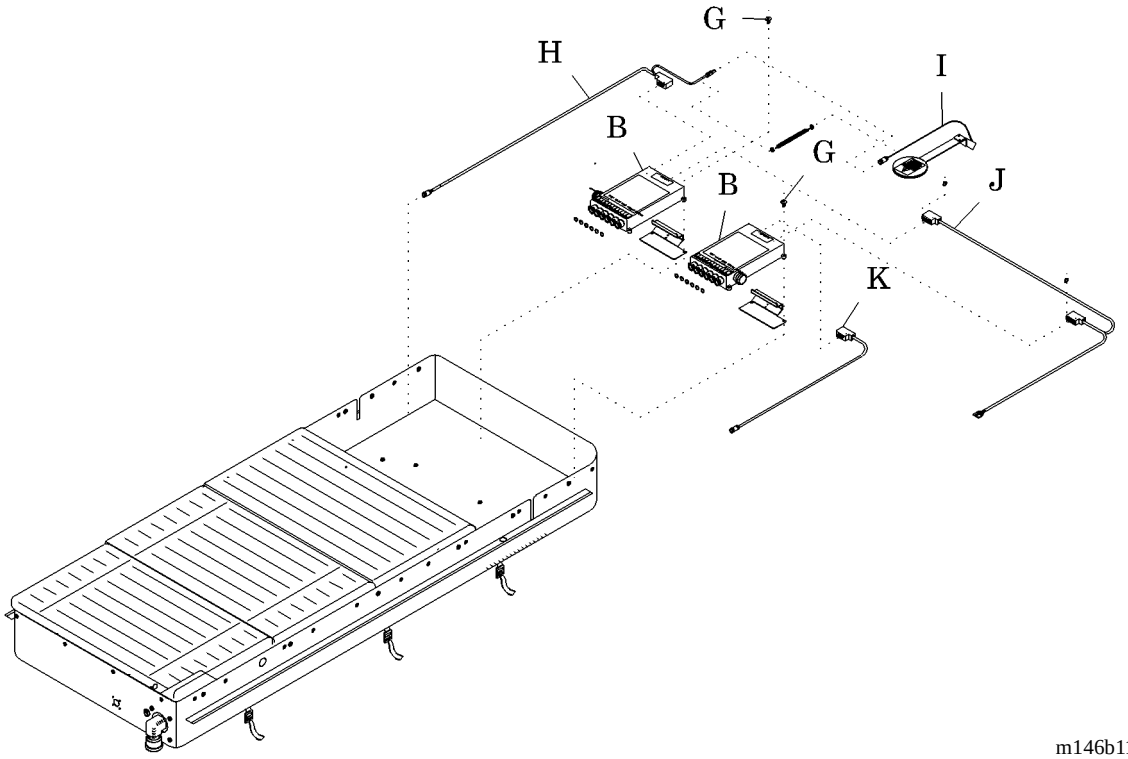
   b. Remove the cover from the proportional valve assembly (B).

1. Allen™ is a trademark of Industrial Fasteners, Inc.

CAUTION:
Disconnect only the proportional valve assembly connector. Do **not** disconnect the transducer sensor tube or the electrical connections. Equipment damage could occur.

10. Disconnect the connections from the proportional valve assembly (B) (see figure 4-22 on page 4-33).
    a. For the right proportional valve assembly (B), disconnect the main sensor adapter cable (H), head-of-bed sensor assembly (I), and mattress cable assembly (J).
    b. For the left proportional valve assembly (B), disconnect the slave sensor adapter cable (K) and the mattress cable assembly (J).

Figure 4-22. Proportional Valve Assembly



11. Using a small screwdriver, remove the four screws (G) that secure the proportional valve assembly (B).

12. Carefully place the lower head cushion (E) in its original position (see figure 4-20 on page 4-31).

13. Remove the proportional valve assembly (B).

Replacement

1. Perform the removal procedure in reverse order.

2. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

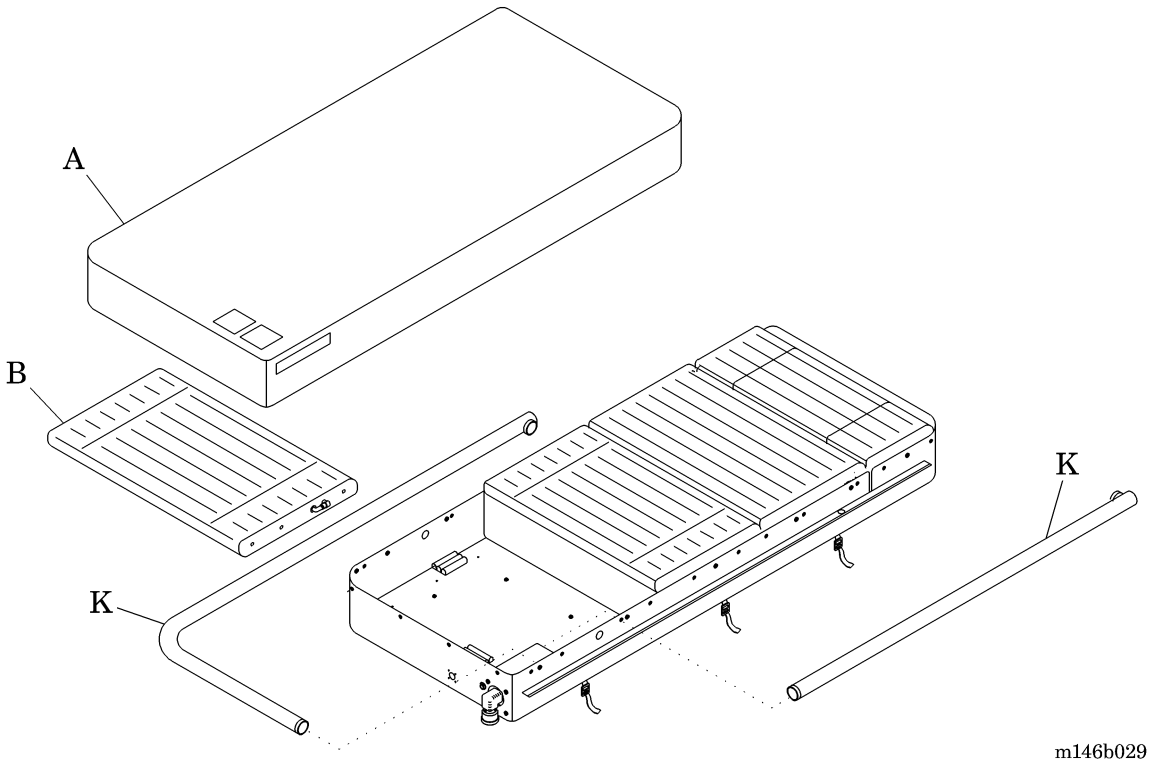
4.15 Percussion/Vibration (P/V) Valve Assembly

Tools required: Phillips head screwdriver
Black marker

Removal

1. Unzip the coverlet (A) (see figure 4-23 on page 4-35).

Figure 4-23. Air Cushions

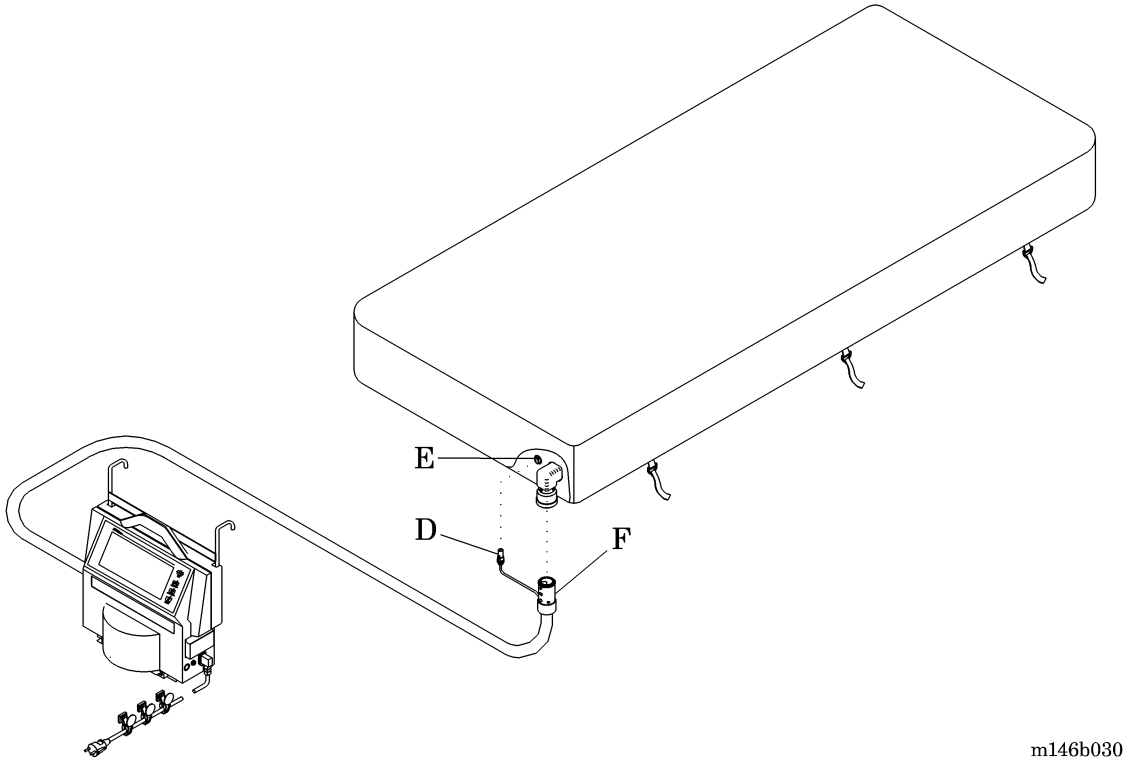


2. Unsnap the left side of the foot air cushions (B).

3. Pull the left corner of the foot air cushions (B) back, and expose the P/V valve assembly (C).

4. Disconnect the air supply cable (D) from the receptacle (E) (see figure 4-24 on page 4-36).

Figure 4-24. Air Supply Cable and Air Hose



5. Disconnect the air hose (F).

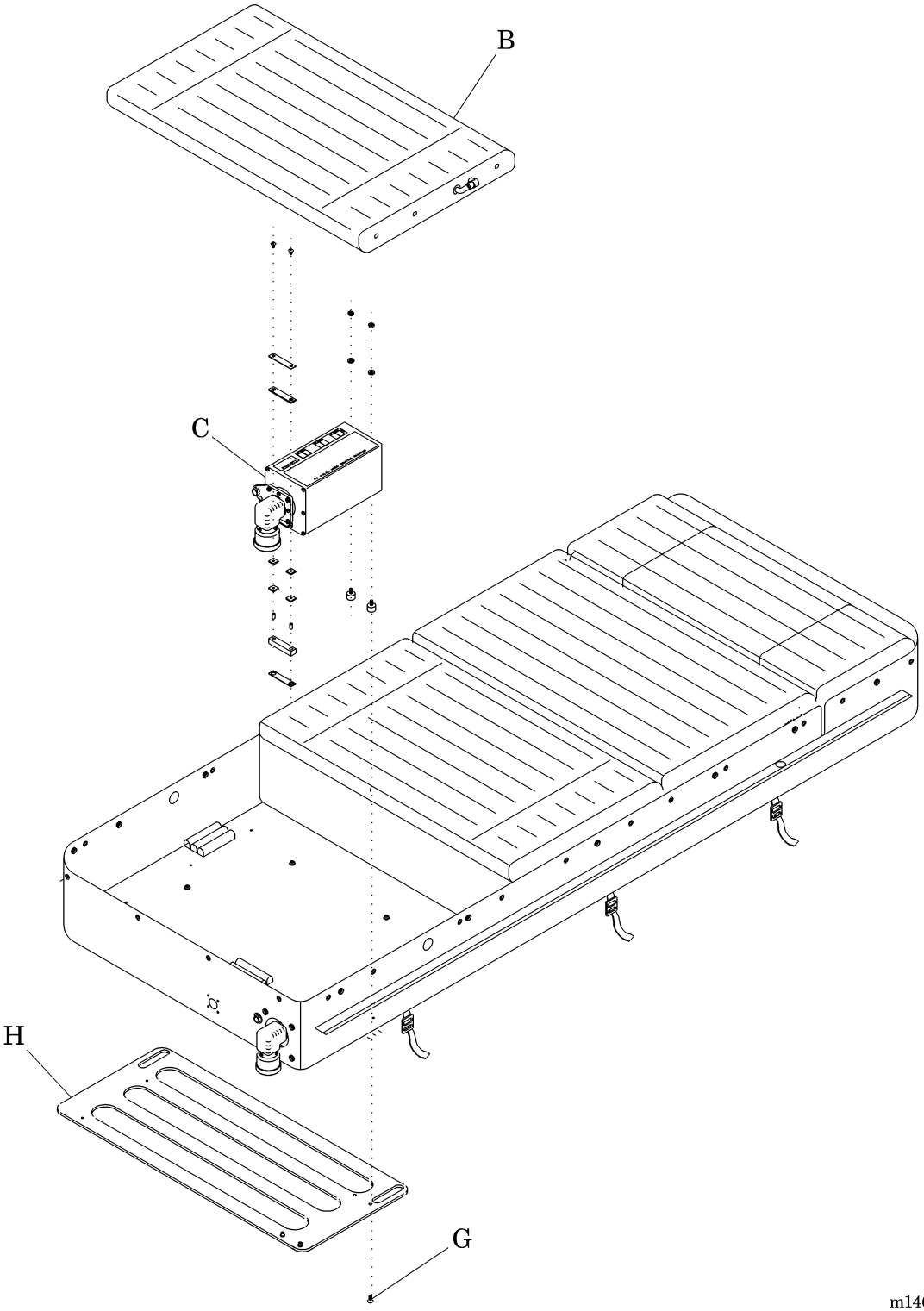
6. Fold the foot end of the foot air cushions (B) toward the head end, exposing the four screws (G) that secure the P/V valve assembly (C) to the plastic foot plate (H) (see figure 4-25 on page 4-37).

7. Using a phillips head screwdriver, remove the four screws (G) that secure the P/V valve assembly (C) to the plastic foot plate (H).

8. Carefully place the foot end of the foot air cushions (B) back to its original position (see figure 4-23 on page 4-35).

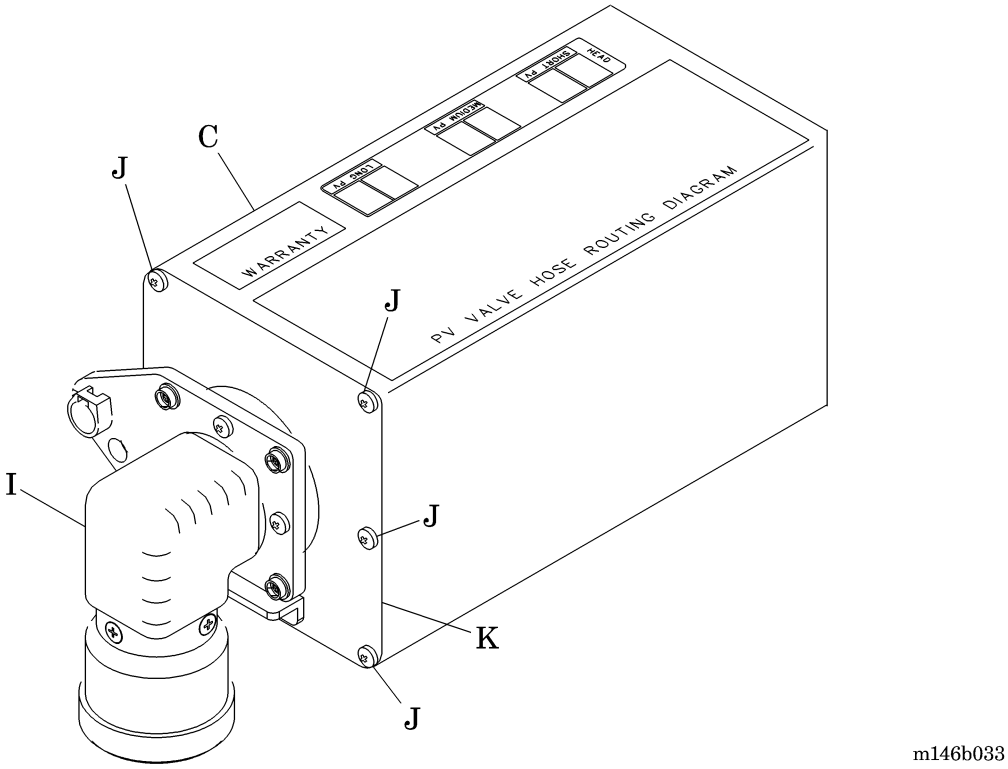
9. Pull off the tubes (K) on the side and rear of the P/V valve assembly (C).

Figure 4-25. P/V Valve Assembly



10. Remove the air supply hose, interface elbow (I) (refer to procedure 4.17) (see figure 4-26 on page 4-38).

Figure 4-26. Air Supply Hose, Interface Elbow



11. Using a phillips head screwdriver, remove the screws (J) that secure the P/V valve assembly, front cover assembly (L).

12. Lift the P/V valve assembly (C) out.

Replacement

1. Perform the removal procedure in reverse order.

2. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

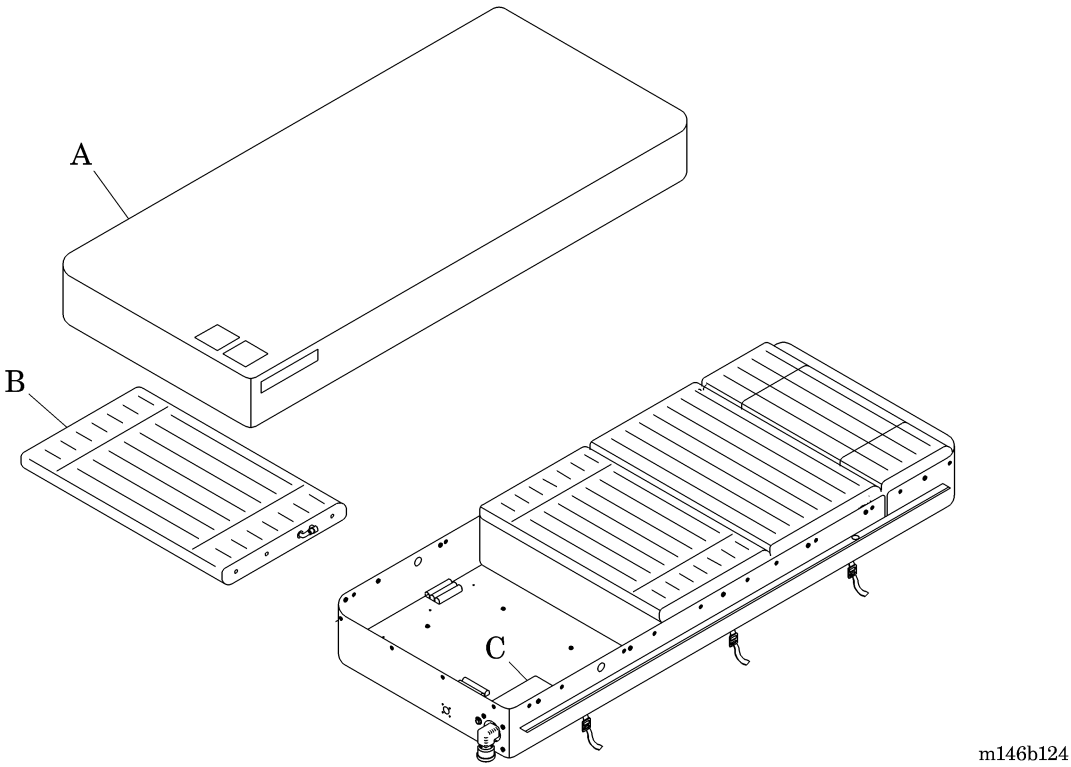
4.16 Percussion/Vibration (P/V) Valve Solenoid P.C. Board Assembly and Heat Sink Pad

Tools required: Black marker
Antistatic wrist strap
¼" nut driver
5/64" Allen™[1] wrench

Removal

1. Unzip the coverlet (A) (see figure 4-27 on page 4-39).

Figure 4-27. Air Cushions



2. Unsnap the left side of the foot air cushions (B).

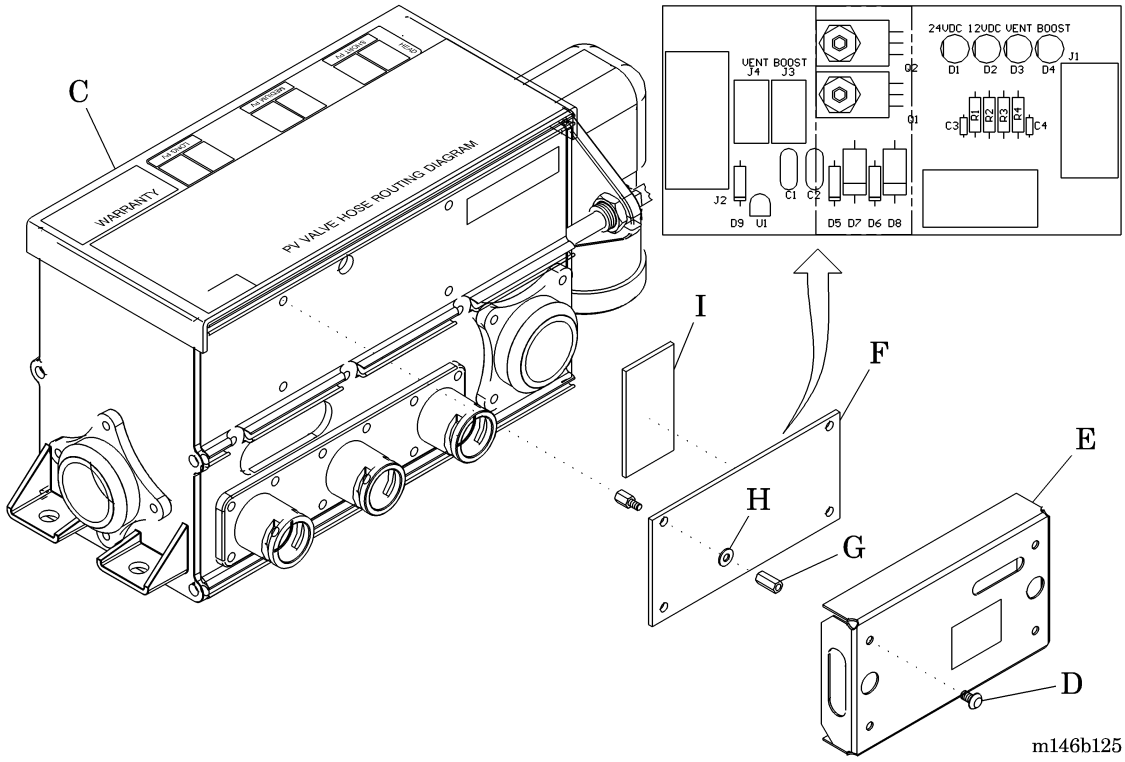
3. Pull the left corner of the foot air cushions (B) back, and expose the P/V valve assembly (C).

NOTE:
You can recognize the P.C. board aluminum cover by the presence of several LEDs.

1. Allen™ is a trademark of Industrial Fasteners, Inc.

4. Using the 5/64" Allen™[1] wrench, remove the four screws (D) that secure the P/V valve P.C. board cover (E) located towards the center of the mattress (see figure 4-28 on page 4-40).

Figure 4-28. P/V Valve P.C. Board



5. Remove the P/V valve P.C. board cover (E).

6. Disconnect all wiring connectors from the solenoid P.C. board assembly (F).

7. Using the ¼" nut driver, remove the four standoffs (G) and washers (H) that secure the solenoid P.C. board assembly (F) to the P/V valve assembly (C).

8. Carefully lift the solenoid P.C. board assembly (F) from the P/V valve assembly (C).

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Replacement

1. Install the heat sink pad (I) on the back of the solenoid P.C. board assembly (F) over D7, D8, and the two screw heads at Q1 and Q2.

2. Perform the removal procedure in reverse order.

3. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

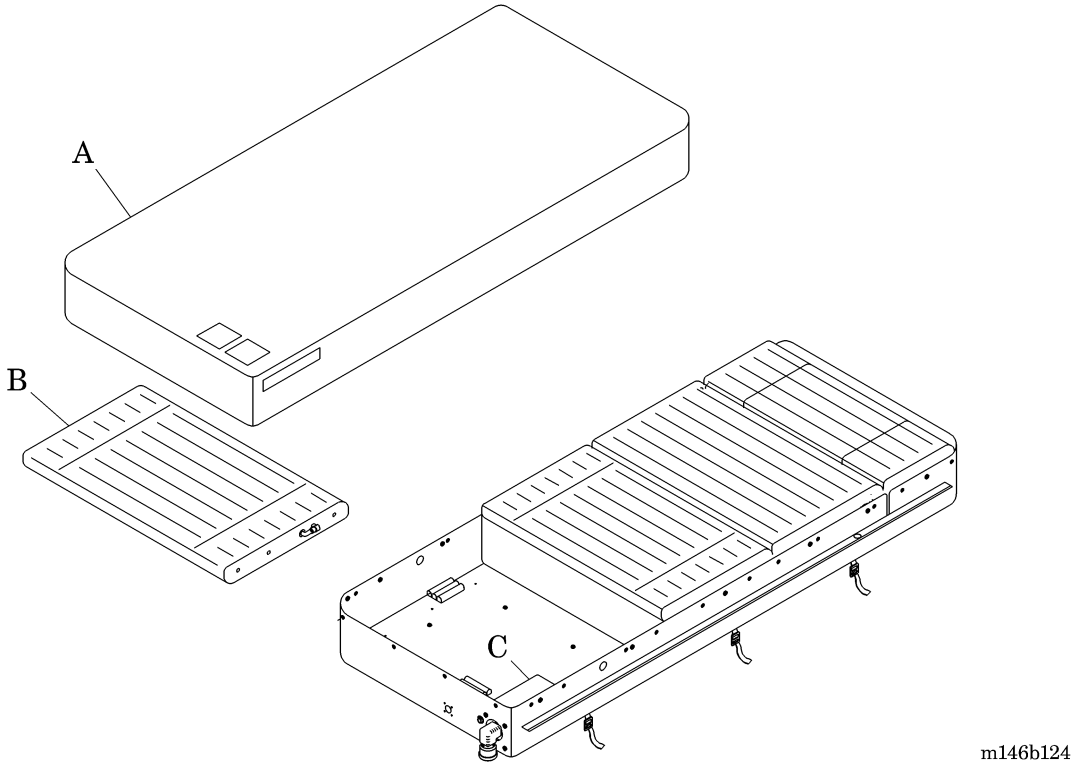
4.17 Percussion/Vibration (P/V) Valve Assembly Air Supply Hose Interface Elbow

Tools required: Phillips head screwdriver
Black marker

Removal

1. Unzip the coverlet (A) (see figure 4-29 on page 4-42).

Figure 4-29. Air Cushions

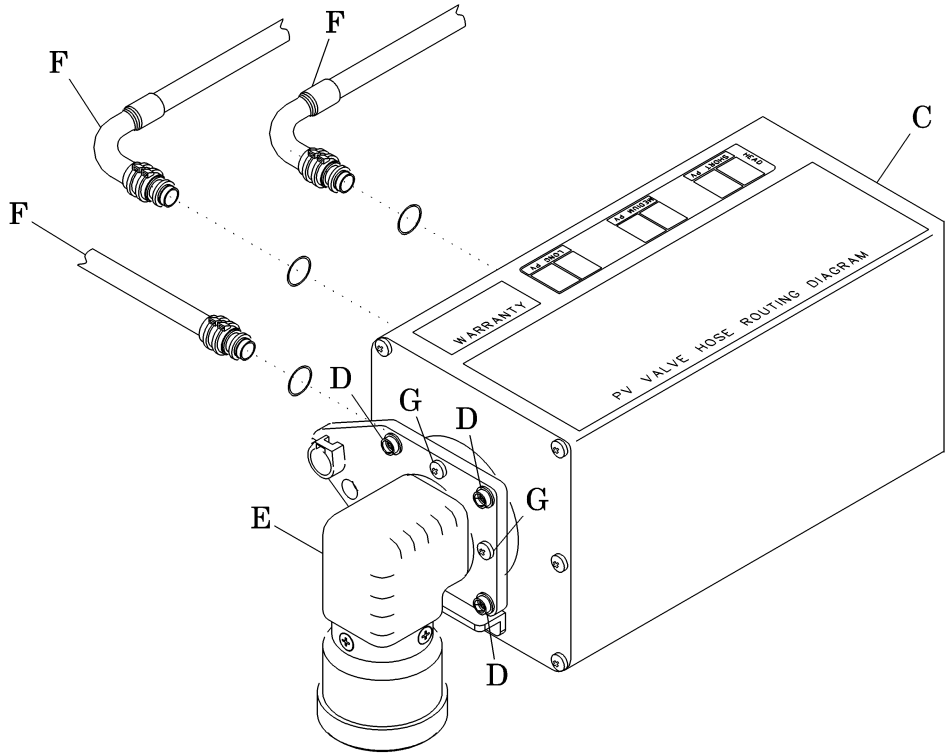


2. Unsnap the left side of the foot air cushions (B).

3. Pull the left corner of the foot air cushions (B) back, and expose the P/V valve assembly (C).

4. Unsnap the four snaps (D) on the air supply hose, interface elbow (E) (see figure 4-34 on page 4-49).

Figure 4-30. Air Supply Hose, Interface Elbow



5. Using a black marker, mark the hoses and fittings for proper assembly.

6. Disconnect the three P/V valve hose connectors (F) on the side of the P/V valve assembly (C).

7. Carefully remove the air supply hose, interface elbow (E) from the lower cushion encasement.

8. Using a phillips head screwdriver, remove the four screws (G) that secure the air supply hose, interface elbow (E) to the P/V valve assembly (C).

9. Remove the air supply hose, interface elbow (E) from the P/V valve assembly (C).

Replacement

1. Perform the removal procedure in reverse order.

2. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

4.18 Power Supply

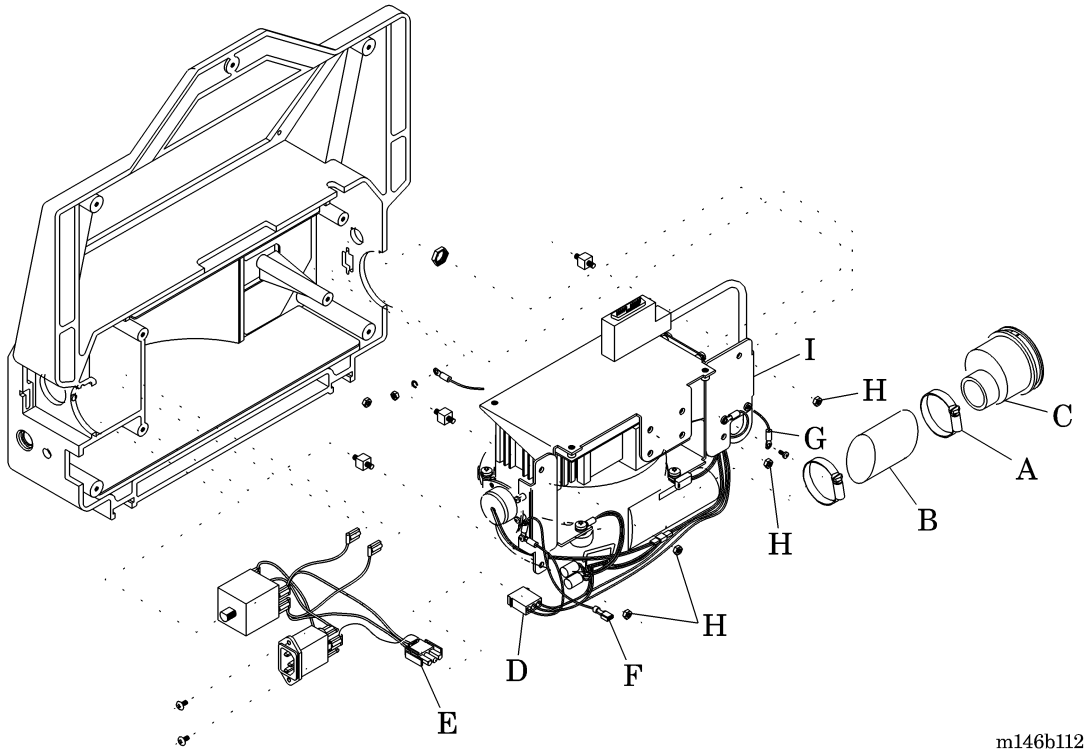
Tools required: Phillips head screwdriver
Small screwdriver
11/32" nut driver

Removal

1. Open the air supply unit case (refer to procedure 4.1).

2. Loosen the hose clamp (A) on the blower tube (B), and remove the blower tube (B) and outlet flange (C) (see figure 4-31 on page 4-44).

Figure 4-31. Blower Motor Bracket and Power Supply



3. Disconnect the in-line connector (D) from the power inlet (E).

4. Remove the chassis ground wire (F) and the DB9 connector ground wire (G).

5. Using a 11/32" nut driver, remove the four nuts (H) that secure the blower bracket (I) and to the front of the unit.

6. Using a small screwdriver, disconnect the pins J7 and J8 (control panel extension harness) from the battery charger P.C. board (J) (see figure 4-32 on page 4-46).

7. Using a small screwdriver, disconnect the pin J3 (serial port harness) from the battery charger P.C. board (J).

8. Gently pull the blower bracket (I) away from the front cover, and disconnect the control panel wire harness (K).

9. Using a phillips head screwdriver, remove the four screws (L) that secure the power supply (M) to the blower bracket (I).

10. Using a small screwdriver, disconnect the pins J1 and J2 from the power supply (M).

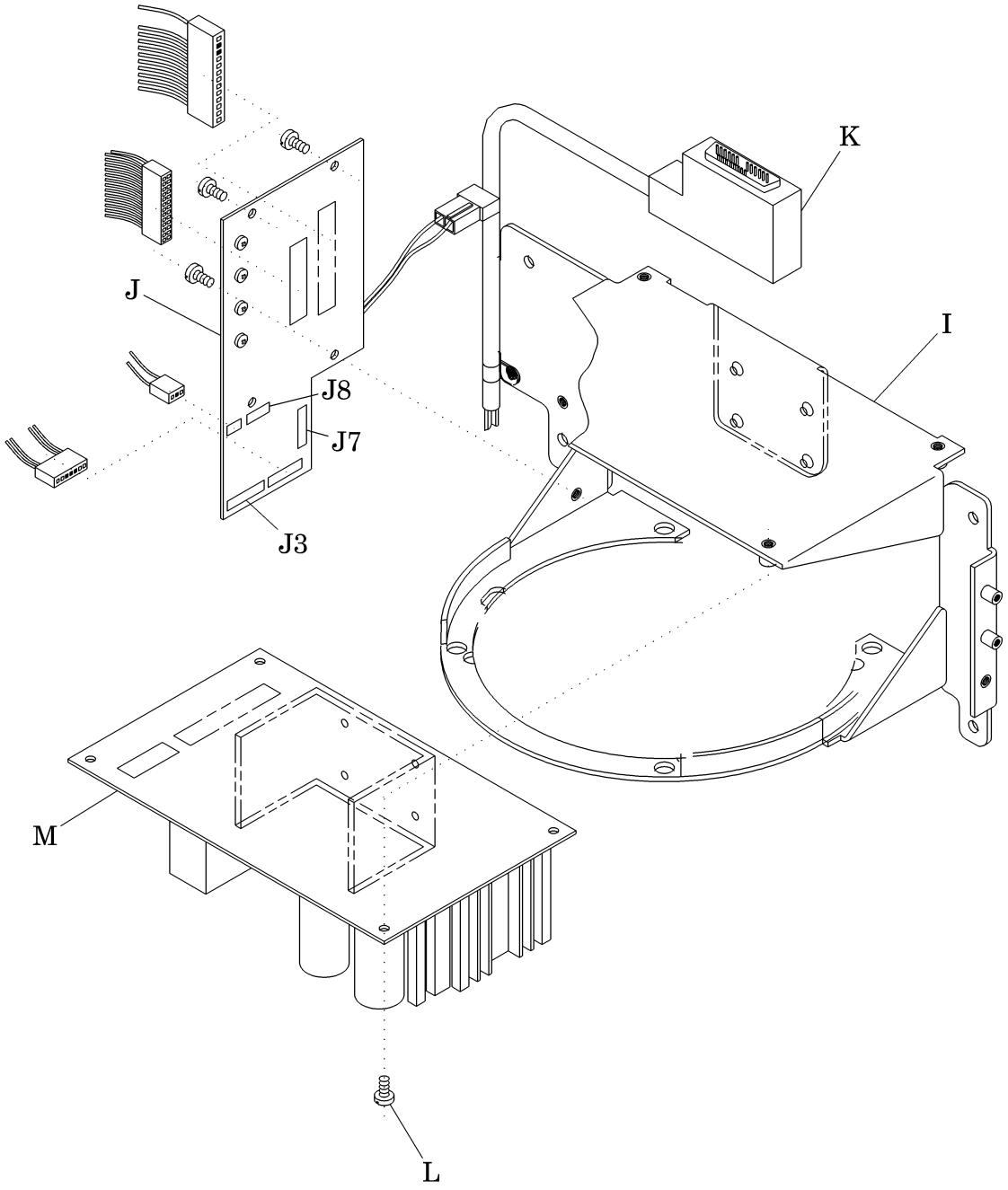
11. Carefully remove the power supply (M) from the blower bracket (I).

Replacement

1. Perform the removal procedure in reverse order.

2. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

Figure 4-32. Power Supply



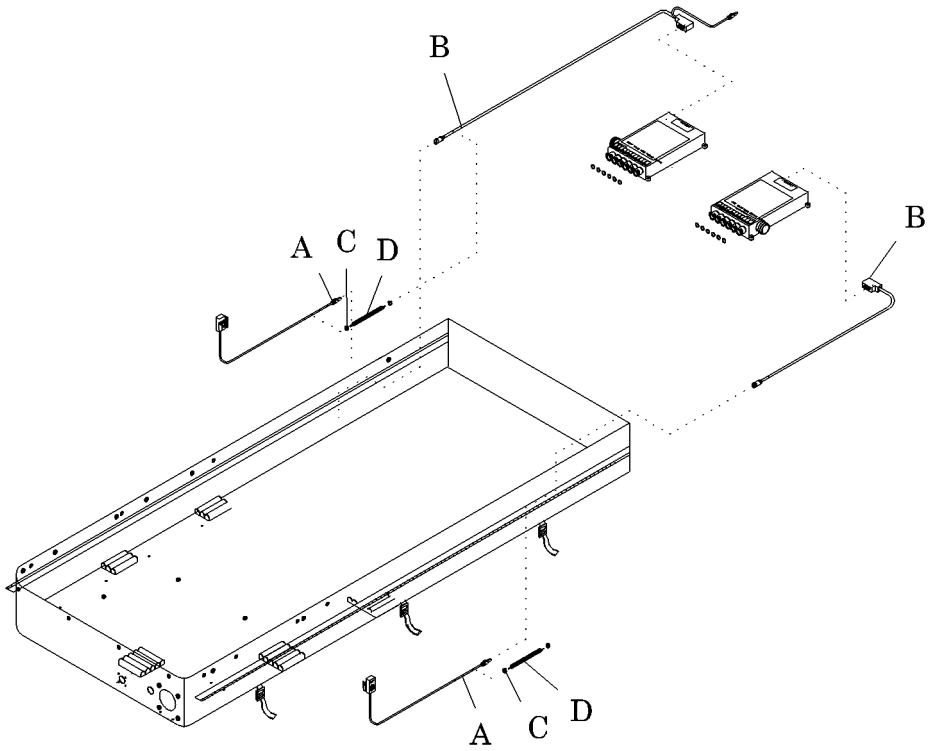
4.19 Siderail Position Sensor Assembly

Tools required: Small cable tie cutter

Removal

1. Disconnect the siderail position sensor assembly (A) from the sensor adapter cable (B) (see figure 4-33 on page 4-47).

Figure 4-33. Siderail Position Sensor Assembly



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2. Using a small cable tie cutter, remove the cable tie (C) that secures the tether (D) to the siderail position sensor assembly (A).

3. Remove the siderail position sensor assembly (A) from the tether (D).

Replacement

1. Perform the removal procedure in reverse order.

2. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

4.20 Sensor Adapter Cable

Tools required: Small cable tie cutter 7/64" Allen™[1] wrench

Removal

1. Remove the siderail position sensor assembly (A) from the main sensor adapter cable (B) or slave sensor adapter cable (C) (refer to procedure 4.19) (see figure 4-35 on page 4-49).

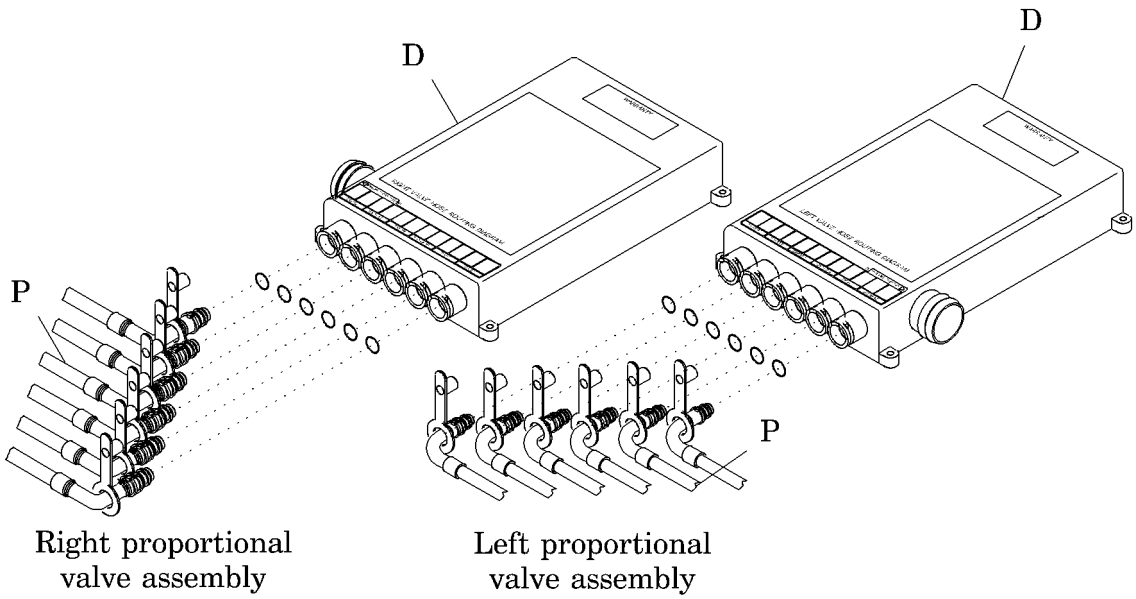
2. If a patient is on the unit, slide him or her away from the proportional valve assembly (D).

3. Unzip the coverlet (M), and unsnap the sleep surface head cushions (N).

4. Pull the corner of the lower head cushions (O) back, and expose the proportional valve assembly (D).

5. Disconnect the head working cushion air supply hose (P) from the proportional valve assembly (D) (see figure 4-34 on page 4-48).

Figure 4-34. Head Working Cushion Air Supply Hose



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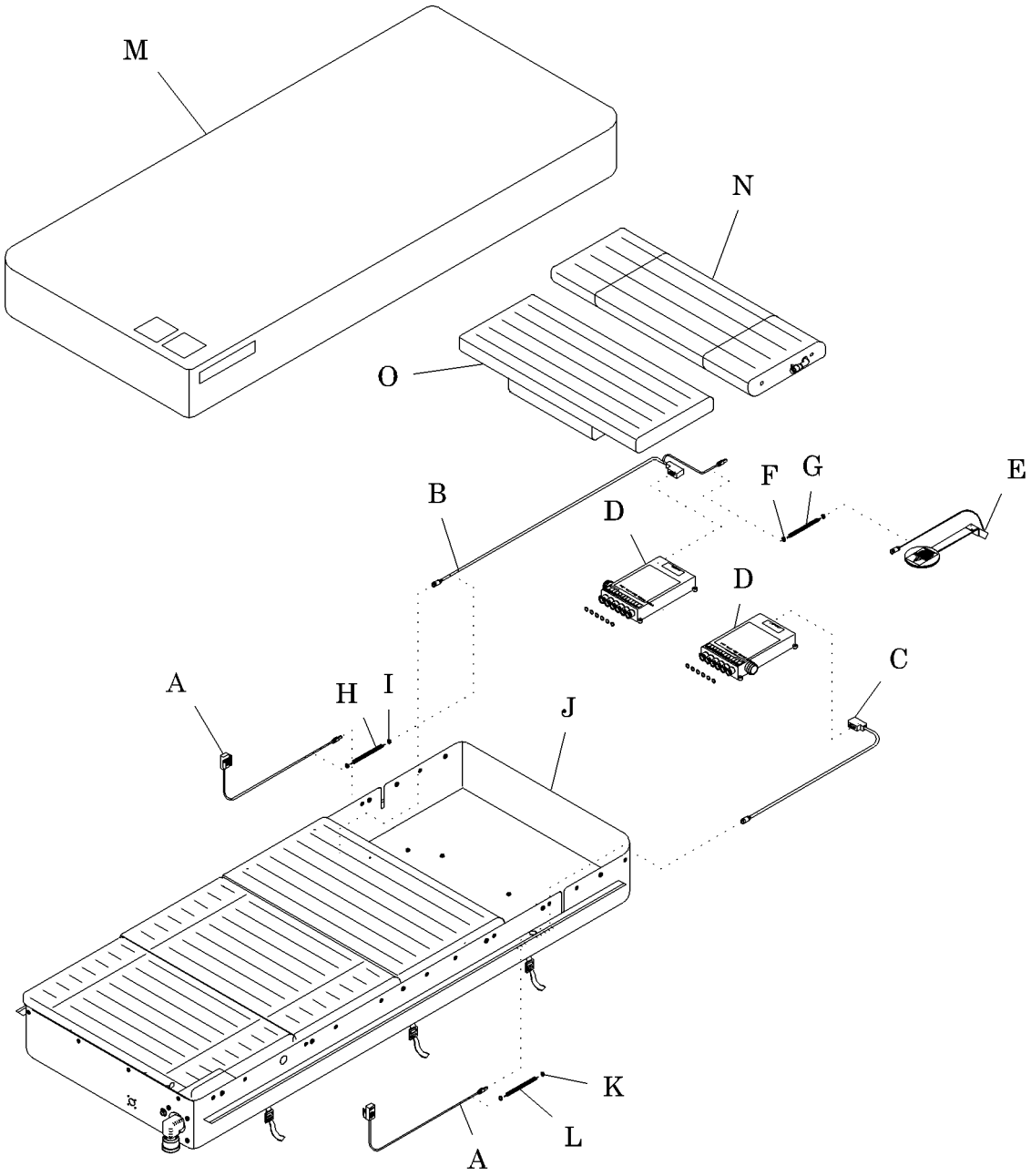
1. Allen™ is a trademark of Industrial Fasteners, Inc.

Figure 4-35. Sensor Adapter Cable



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6. Fold the lower head cushions (O) back under the sleep surface head cushion (N) (see figure 4-35 on page 4-49).

7. With a proportional valve assembly (D) model that has an LED window, perform the following:
   a. Using a 7/64" Allen™[1] wrench, remove the two setscrews that secure the cover to the proportional valve assembly (D).
   b. Remove the cover from the proportional valve assembly (D).

8. To remove the main sensor adapter cable (B), perform the following:
   a. Disconnect the main sensor adapter cable (B) from the proportional valve assembly (D).
   b. Disconnect the main sensor adapter cable (B) from the head of bed sensor assembly (E).
   c. Using a small cable tie cutter, remove the cable tie (F) that secures the tether (G) to the main sensor adapter cable (B).
   d. Using a small cable tie cutter, remove the cable tie (H) that secures the tether (I) to the main sensor adapter cable (B).
   e. Remove the main sensor adapter cable (B) from the encasement (J).

9. To remove the slave sensor adapter cable (C), perform the following:
   a. Disconnect the slave sensor adapter cable (C) from the proportional valve assembly (D).
   b. Using a small cable tie cutter, remove the cable tie (K) that secures the tether (L) to the slave sensor adapter cable (C).
   c. Remove the slave sensor adapter cable (C) from the encasement (J).

Replacement

1. Perform the removal procedure in reverse order.

2. To ensure proper operation of the V-CUE™ Dynamic Air Therapy® Unit, perform the “Function Checks” on page 2-4.

1. Allen™ is a trademark of Industrial Fasteners, Inc.

Chapter 5
Parts List

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Warranty

HILL-ROM, INC.
LIMITED WARRANTY

Hill-Rom, Inc. (Hill-Rom) has a long tradition of providing superior products and service to our customer. Our goal is "Total Customer Satisfaction". In that spirit, Hill-Rom is proud to offer the following warranty.

GENERAL WARRANTY (APPLICABLE UNLESS A SPECIFIC WARRANTY IS LISTED)

Hill-Rom warrants to the original purchaser that its products and replacement parts shall be free from defects in material and workmanship for a period of one (1) year from date of delivery. Hill-Rom's obligation under this warranty is expressly limited to supplying replacement parts and/or service for, or replacing, at its option, any product which is, in the sole discretion of Hill-Rom, found to be defective. In addition to the foregoing one year warranty, Hill-Rom warrants to the original purchaser that the frame and welds on its products will be free from structural defects for the life of the product. Any product upgrade or modification initiated by Hill-Rom does not affect the original product warranty.

SPECIFIC WARRANTIES

MATTRESS WARRANTIES

Hill-Rom warrants to the original purchaser that its mattress product shall be free from defects in material and workmanship for a period of two (2) years from date of delivery. However, electro mechanical mattress components (compressors, valves, printed circuit boards, hoses, and couplers) are covered by the general one (1) year warranty.

EXPENDABLES WARRANTIES

A sixty (60) day limited warranty from date of delivery applies to expendable parts such as cushions, coverlets, software diskettes, locator badge batteries, dome light incandescent bulbs, overhead fluorescent tubes, heating elements, temperature probes, filter sheets, and microspheres. This warranty is limited to replacement of the parts covered.

TO OBTAIN PARTS AND SERVICE

In the United States, call Hill-Rom Technical Support Department at (800) 445-3720, Monday through Friday. In Canada, call Hill-Rom Technical Support Department at (800) 267-2337, Monday through Friday. Outside the United States and Canada, call your authorized Hill-Rom Distributor. In order to expedite service, we request you furnish the following information: customer identification number, product model number, serial number, and description of problem. A qualified specialist will provide, via telephone (United States and Canada), or FAX (Outside the United States and Canada), troubleshooting assistance for facility personnel and provide necessary parts to make repairs. If troubleshooting determines the need for on-site technical service, a qualified service representative will be dispatched. Replacement of non-technical items will be the responsibility of the customer. If requested by Hill-Rom, products or parts for which a warranty claim is made shall be returned prepaid to Hill-Rom's factory.

OUT OF WARRANTY EXCHANGE POLICY

After the expiration of the original warranty, upon request, Hill-Rom will ship as a replacement, components such as selected: motors and printed circuit boards, for like units returned to Hill-Rom by the original purchaser at a substantial savings. Please call Hill-Rom Technical Support Department for current pricing.

PARTS AVAILABILITY POLICY

Hill-Rom will offer parts for new and remanufactured products for ten (10) years from date of sale; for communications products for five (5) years from date of sale.

Note: Some original component parts and assemblies may not be available; functional equivalents may be substituted.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS WARRANTIES AND IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS OF PURPOSE. HILL-ROM'S OBLIGATION UNDER THESE WARRANTIES SHALL NOT INCLUDE ANY LIABILITY FOR LOSS OF PROFITS, DIRECT, INDIRECT OR CONSEQUENTIAL DAMAGES OR DELAYS. Some states, provinces, or countries do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitation may not apply. Any improper or negligent use, any alterations or repairs not in accordance with Hill-Rom's manuals or performed by others in such manner as in Hill-Rom's sole judgment affects the product materially and adversely, shall void these warranties. These warranties do not cover failures due to misuse, abuse, neglect, or lack of routine maintenance. No employee or representative of Hill-Rom is authorized to change these warranties in any way or grant any other warranty unless in writing and signed by a Hill-Rom officer. These warranties provide specific legal rights; but, there may be other available rights, which vary from state to state, province to province, or country to country.

Revised October 20, 1998

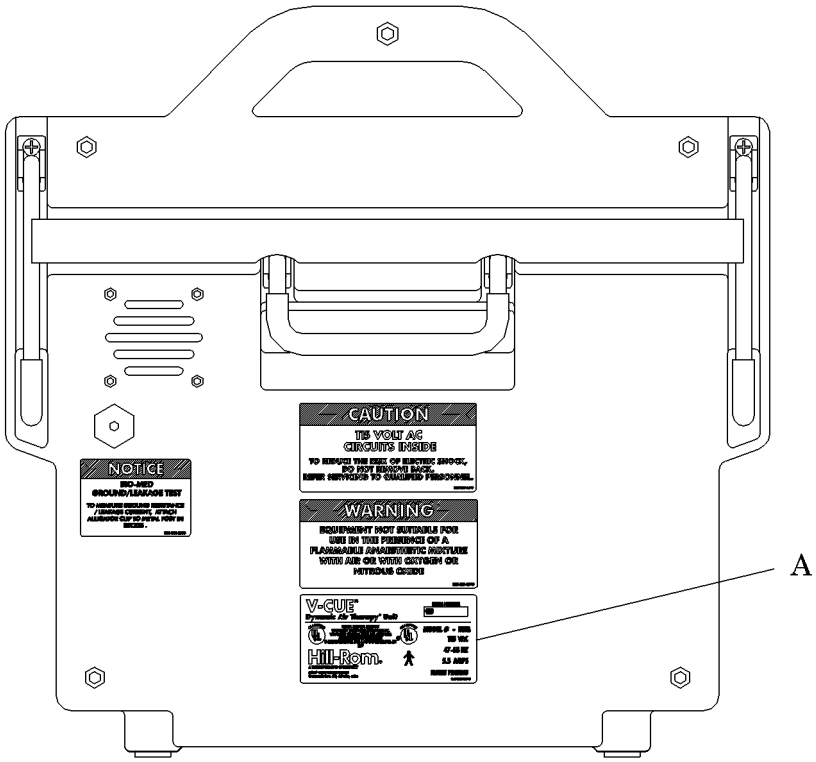
Hill-Rom Company, Inc., 1069 State Route 46 E, Batesville, IN 47006-9167

NOTES:

Service Parts Ordering

Using the parts lists in this manual, identify the part number(s) you require. Find the product number and serial number on the product identification label (A) (see figure 5-1 on page 5-5).

Figure 5-1. Product Identification Label Location



Call Hill-Rom Technical Support at (800) 445-3720 with the following information:

- Six-digit customer account number
- Purchase order number
- Product number
- Serial number
- Part number(s)

To promptly order parts, request part prices and availability, or follow up on a service order, use the following Hill-Rom fax number:

(812) 934-8472

5

Terms:

- Net 30 days
- F.O.B. Batesville, IN
- Prepaid shipping charges added to invoice
- All orders shipped UPS ground unless specified

Address all inquiries to:

ATTN TECHNICAL SUPPORT—PARTS
HILL-ROM COMPANY, INC.
1069 STATE ROUTE 46 E
BATESVILLE IN 47006-9167

Address all return goods to:

ATTN SERVICE STORES
DISTRIBUTION CENTER DOOR D23
HILL-ROM COMPANY, INC.
COUNTY ROAD 300E
BATESVILLE IN 47006-9167

NOTE:
To eliminate possible delays or incorrect billings, **do not** return any items without a Return Material Authorization (RMA) number. When a return is requested, an RMA packet is included with each order. This packet includes an RMA number, instructions, and a shipping label. If an RMA number is not available, obtain one by phoning Hill-Rom Technical Support at (800) 445-3720.

Exchange Policy

The following are policies for in-warranty and out-of-warranty exchanges from Hill-Rom.

In-Warranty Exchanges

In some cases, Hill-Rom will request that parts/products be returned for inspection. When this occurs, you are expected to return parts/products within 30 days of receipt of the exchange part. If you fail to return the inoperative parts/products within the 30 day period, Hill-Rom will invoice your facility for the full selling price of the parts/products.

NOTE:
The preceding billing procedure pertains **only** to parts/products that Hill-Rom requests to be returned.

In some cases, the invoice accompanying the parts will show the full selling price (only for internal use at Hill-Rom). Do not confuse this price with your price.

Do not return any parts without an RMA number. When parts/products have been requested to be returned, Hill-Rom will include an RMA packet with the parts/products shipment. If an RMA number is not available, obtain one by phoning Hill-Rom Technical Support at (800) 445-3720.

Out-of-Warranty Exchanges

You are expected to return the inoperative parts/products within 30 days of receipt of the exchange part. Hill-Rom will include an RMA packet with the parts/products shipment. If an RMA number is not available, obtain one by phoning Hill-Rom Technical Support at (800) 445-3720. Hill-Rom will invoice your facility for the full selling price of the parts/products. Upon return of the inoperative parts/products, Hill-Rom will issue a credit to your facility for **the difference between the exchange price and the full selling price of the parts/products**.

Recommended Spare Parts

For a recommended spare parts list to service five units or more, see table 5-1 on page 5-8.

Table 5-1. Recommended Spare Parts List

Part Number	Quantity	Description
030-027-0009	1	Power cord (120V model only)
030-027-0020	1	Cord, Continental Europe power (International 230V model only)
030-027-0023	1	Cord, Australia/New Zealand power (Australian 230V model only)
419-020-0016	1	Head of bed sensor
419-020-0032	1	Left siderail position sensor assembly
419-020-0033	1	Right siderail sensor assembly
419-030-0004	1	Control panel assembly (120V model only)
419-030-0019	1	International control panel assembly (230V model only)
419-030-0005	1	Air supply hose assembly
419-030-0076	1	Right proportional valve assembly
419-030-0077	1	Left proportional valve assembly
419-010-0038	1	Elbow assembly without cover
300-001-0028	1	Filter, air intake
150-002-0054	2	O-ring (for air supply hose)

NOTES:

Air Supply Unit—P541A001 and P541A026

Figure 5-2. Air Supply Unit—P541A001 and P541A026

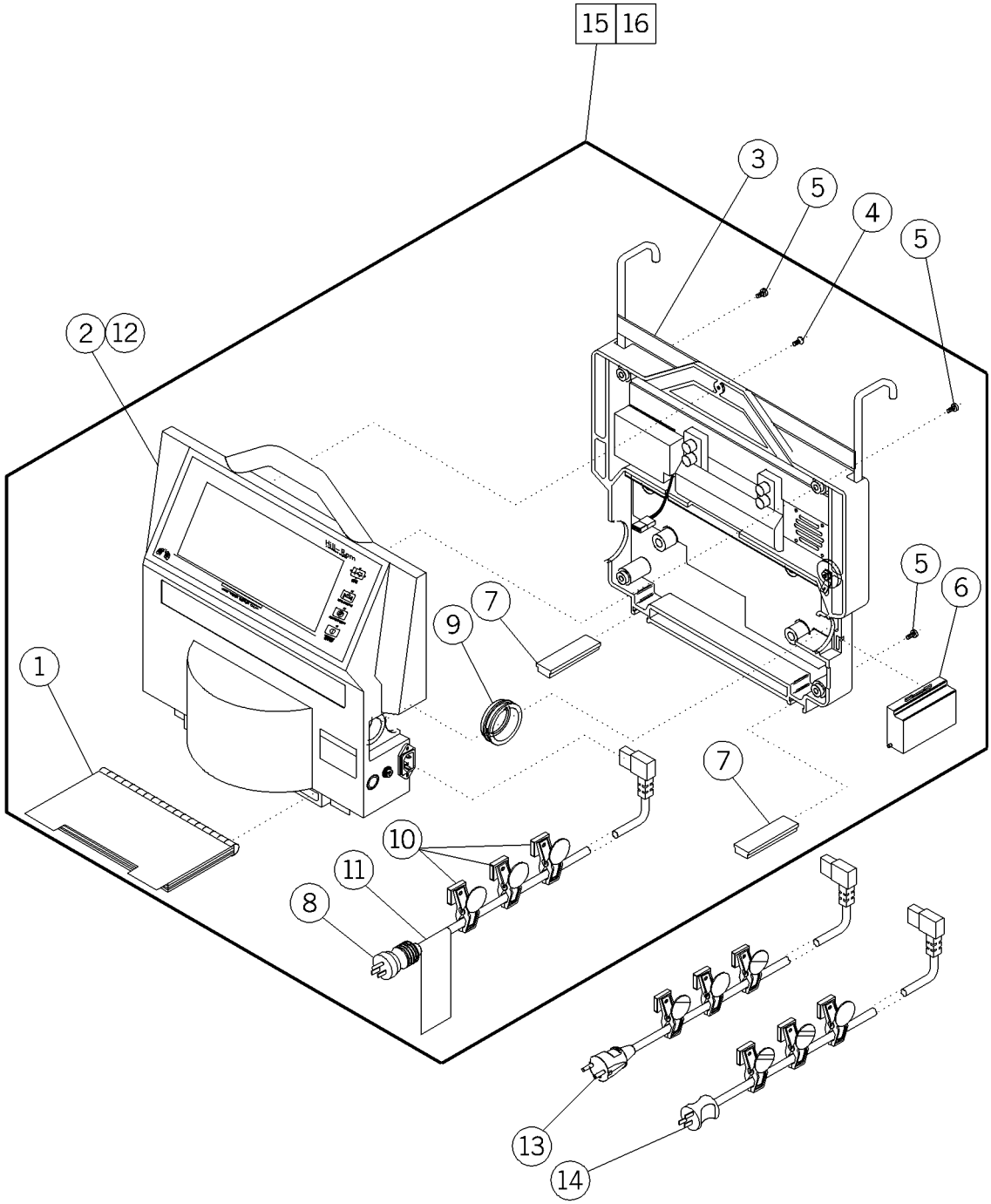


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Table 5-2. Air Supply Unit—P541A001 and P541A026

Item Number	Part Number	Quantity	Description
1	280-002-0019	1	*V-CUE™ Dynamic Air Therapy® Unit User Manual*
2	Reference only	1	Front case assembly (120V model only)
3	419-030-0002	1	Rear case assembly
4	001-033-0021	1	Screw, #10—32 x ¾", machine
5	001-033-0023	4	Screw, #10—32 x ¾", sems
6	419-010-0025	1	Filter cover assembly
7	150-007-0023	2	Housing, foot—front, 3.36"
8	030-027-0009	1	Power cord (120V model only)
9	719-120-0016	1	Flange, inlet
10	414-010-0022	3	Magnetic clip
11	060-001-0287	1	Label, warning grounding (120V model only)
12	419-030-0025	1	International front case assembly (230V model only)
13	030-027-0020	1	Cord, Continental Europe power (International 230V model only)
14	030-027-0023	1	Cord, Australia/New Zealand power (Australian 230V model only)
15	Reference only	1	Air supply unit (120V model only)
16	Reference only	1	Air supply unit (230V model only)

Front Case Assembly

Figure 5-3. Front Case Assembly

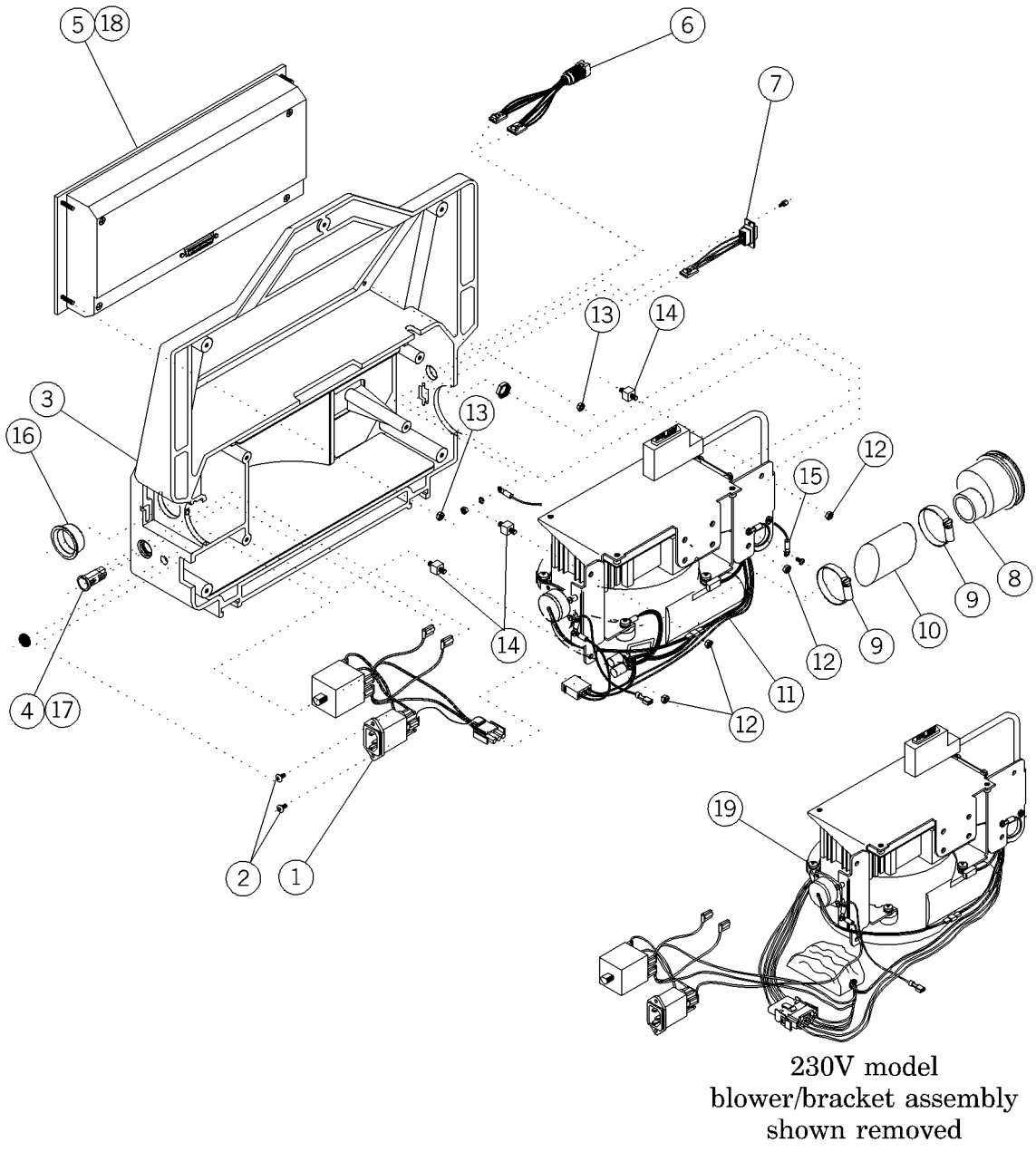

Table 5-3. Front Case Assembly

Item Number	Part Number	Quantity	Description
1	419-020-0020	1	Power entry—breaker assembly (120V model only)
2	001-030-0012	2	Screw machine, #4—40 x ½"
3	419-010-0024	1	Front case subassembly
4	030-012-0020	1	Lamp, indicator 115V (120V model only)
5	419-030-0004 ***	1	Control panel assembly (120V model only)
6	419-020-0009	1	Cable assembly control extension
7	419-020-0011	1	Cable assembly, DB9 extension
8	719-120-0001	1	Flange, outlet
9	001-005-0008	2	Hose clamp, ¾" x 1¾"
10	150-005-0118	1	Tube, blower
11	419-030-0006	1	Blower/bracket assembly
12	001-004-0032	4	Nut, #8—32 external keps
13	001-004-0033	4	Nut, #6—32
14	330-050-0032	4	Mounting, square
15	419-020-0006	1	Ground wire, DB9 connector
16	150-007-0140	1	Plug, tapered
17	030-012-0019	1	Lamp, indicator—240V (230V model only)
18	419-030-0019 ***	1	International control panel assembly (230V model only)
19	419-030-0017	1	240V blower/bracket assembly (230V model only)

*** This is a Return Goods Authorization (RGA) part.

Rear Case Assembly

Figure 5-4. Rear Case Assembly

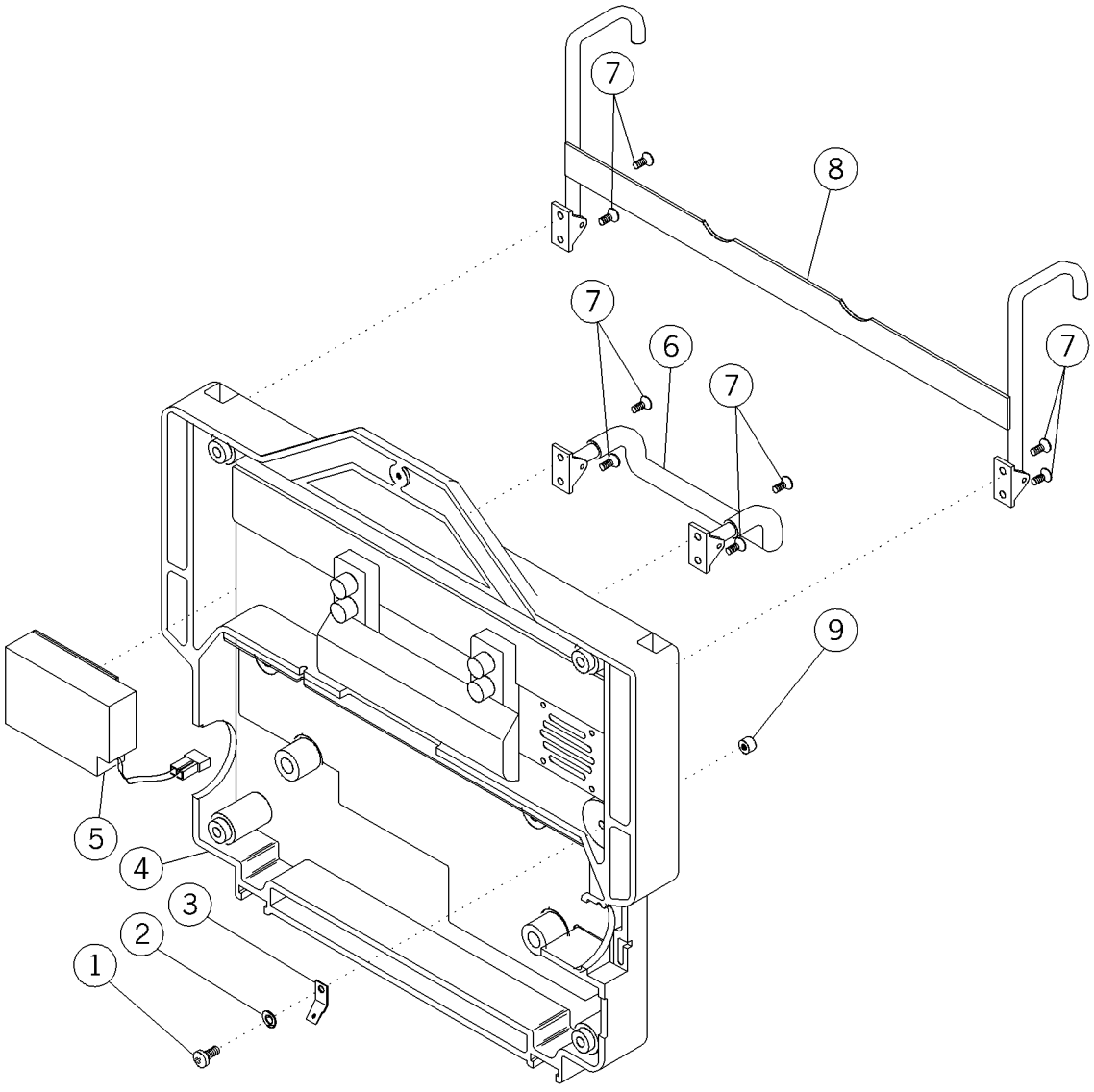

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Table 5-4. Rear Case Assembly

Item Number	Part Number	Quantity	Description
1	001-033-0018	1	Screw, sems, #10—32 x ½"
2	001-022-0004	2	Washer, flat
3	030-022-0087	1	Tab, male
4	419-010-0023	1	Rear case subassembly
5	419-020-0021	1	Battery assembly
6	419-010-0018	1	Hanger assembly, small
7	001-033-0045	8	Screw, #10—32 x 3/8"
8	419-010-0001	1	Hanger assembly, large
9	001-006-0048	1	Standoff, 3/8"

Front and Rear Case Foam Subassemblies

Figure 5-5. Front and Rear Case Foam Subassemblies

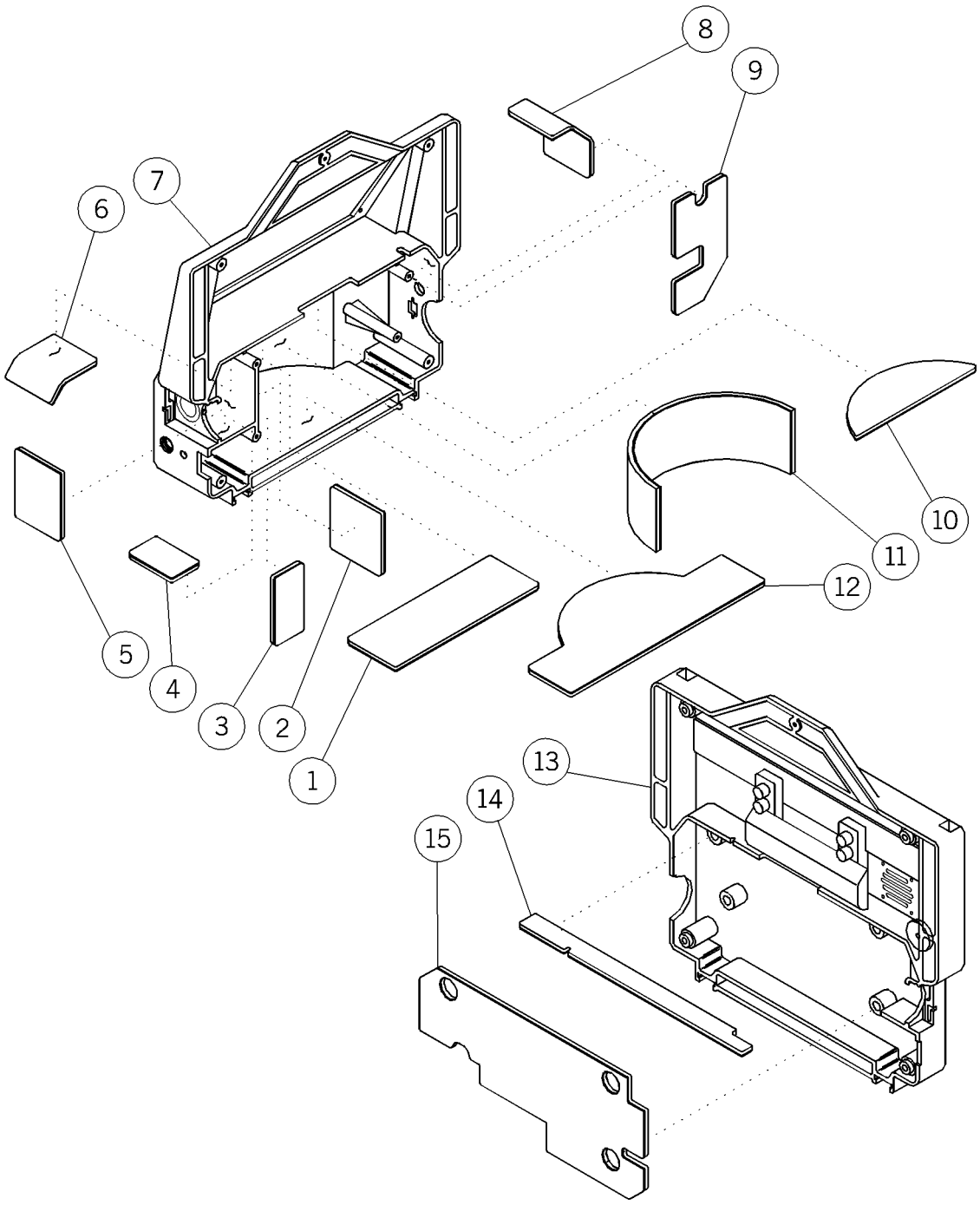

Table 5-5. Front and Rear Case Foam Subassemblies

Item Number	Part Number	Quantity	Description
1	070-007-0007	1	Foam, front case top
2	070-007-0014	1	Foam, inner rib
3	070-007-0008	1	Foam, left front case
4	070-007-0012	1	Foam, bottom
5	070-007-0011	1	Foam, inlet back
6	070-007-0013	1	Foam, inlet top
7	619-060-0002	1	Case, front
8	070-007-0010	1	Foam, front case—right
9	070-007-0002	1	Foam, right front case
10	070-007-0004	1	Foam, upper blower
11	070-007-0005	1	Foam, blower radius
12	070-007-0006	1	Foam, front case bottom
13	619-060-0001	1	Case, rear
14	070-007-0003	1	Foam, rear case top
15	070-007-0001	1	Foam, rear case

Mattress Assembly

Figure 5-6. Mattress Assembly

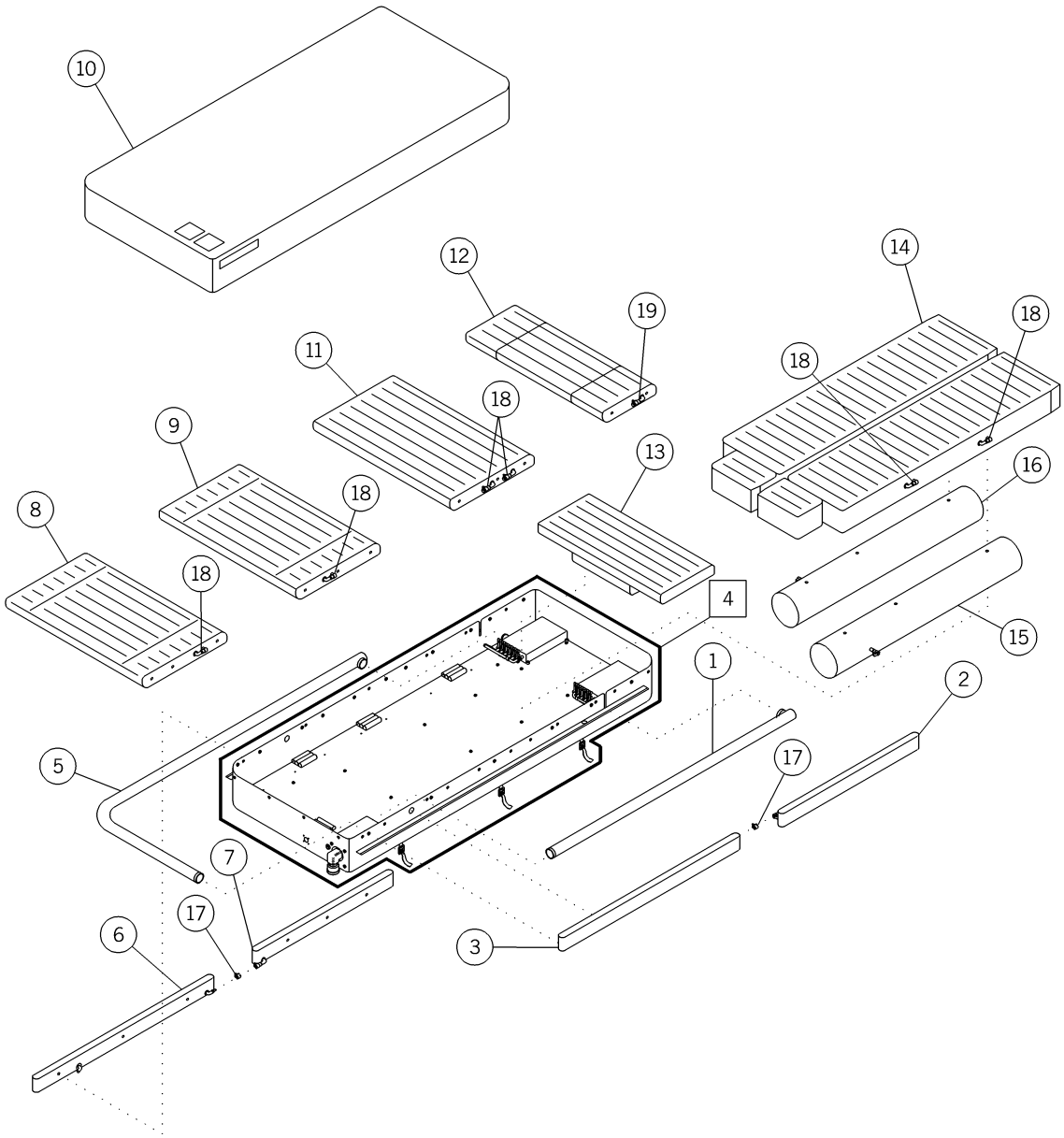

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Table 5-6. Mattress Assembly

Item Number	Part Number	Quantity	Description
1	100-004-0171	1	Tube, straight feed
2	100-004-0175	1	Cushion, left sleep surface head width, exterior
3	100-004-0176	1	Cushion, left sleep surface foot width, exterior
4	419-030-0009	1	Mattress subassembly
5	100-004-0172	1	Tube, right angle
6	100-004-0174	1	Cushion, right sleep surface foot width, exterior
7	100-004-0173	1	Cushion, right sleep surface head width, exterior
8	100-004-0164	1	Cushion, sleep surface foot
9	100-004-0168	1	Cushion, sleep surface seat
10	100-005-0090	1	Coverlet
11	100-004-0169	1	Cushion, sleep surface chest
12	100-004-0166	1	Cushion, sleep surface head
13	100-004-0165	1	Cushion, lower head
14	100-004-0167	1	Cushion, lower body
15	100-004-0170	1	Cushion, left extended rotation
16	100-004-0177	1	Cushion, right extended rotation
17	030-004-0011	2	Tie, cable
18	619-060-0004	18	Ring, CPC fitting (long) (old style mattress only)
19	619-060-0005	3	Ring, CPC fitting white (short) (old style mattress only)

Mattress Subassembly—P451A08

Figure 5-7. Mattress Subassembly—P451A08

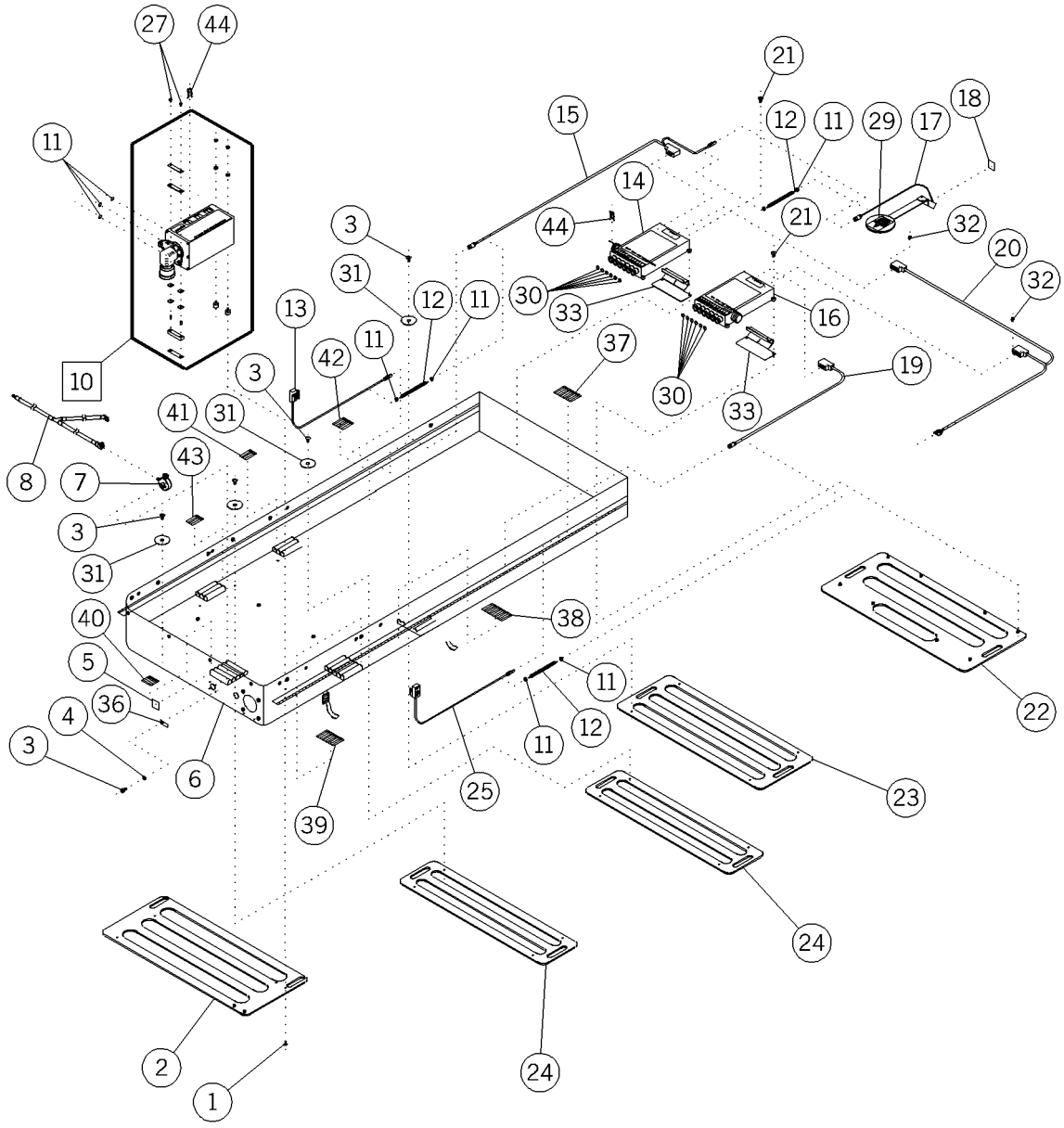

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Table 5-7. Mattress Subassembly—P451A08

Item Number	Part Number	Quantity	Description
1	Reference only	2	Screw, #4—20 x 3/8" flat head
2	719-120-0017	1	Plate, foot
3	001-031-0025	18	Screw, #6—32 x ¼" pan head
4	001-023-0007	4	Fender washer #6
5	060-001-0452	1	Label, 3-way valve
6	100-004-0163	1	Encasement, lower
7	419-010-0019	1	Three-way valve assembly
8	419-010-0020	1	Hose assembly three-way valve
9			
10	419-030-0078 ***	1	Percussion/vibration valve assembly
11	030-004-0011	5	Tie, cable
12	100-006-0023	3	Tether, siderail/head of bed
13	419-020-0033	1	Right siderail sensor assembly
14	419-030-0076 ***	1	Right proportional valve assembly
15	419-020-0018	1	Cable, main sensor adapter
16	419-030-0077 ***	1	Left proportional valve assembly
17	419-020-0016	1	Head of bed sensor assembly
18	060-001-0466	1	Label, head of bed
19	419-020-0019	1	Cable, slave sensor adapter
20	419-020-0007	1	Cable assembly, mattress
21	001-033-0018	8	Screw, #10-32 x ½" external sems
22	719-120-0008	2	Plate, head
23	719-120-0007	1	Plate, chest
24	719-120-0009	2	Plate, seat/thigh
25	419-020-0032	1	Left siderail position sensor assembly
26			
27	Reference only	2	Screw, #10—32 x ¾" sems

*** This is a Return Goods Authorization (RGA) part.

Item Number	Part Number	Quantity	Description
28			
29	060-001-0522	1	Label, head of bed sensor plate
30	150-002-0060	15	O-ring
31	001-023-0013	14	Washer, fender 1¼" outer diameter
32	030-004-0001	2	Ty-wrap 3 7/8" (cable tie)
33	419-010-0032	2	Connector guard assembly
34			
35			
36	060-001-0595	1	Label, mattress tracking number
37	060-001-0601	1	Label, left chest encasement
38	060-001-0602	1	Label, left seat encasement
39	060-001-0603	1	Label, left thigh encasement
40	060-001-0604	1	Label, foot encasement
41	060-001-0605	1	Label, right seat encasement
42	060-001-0606	1	Label, right chest encasement
43	060-001-0607	1	Label, right thigh encasement
44	619-040-0004	15	Clip, valve quick disconnect

NOTES:

Internal Mattress Hose Assembly

Figure 5-8. Internal Mattress Hose Assembly

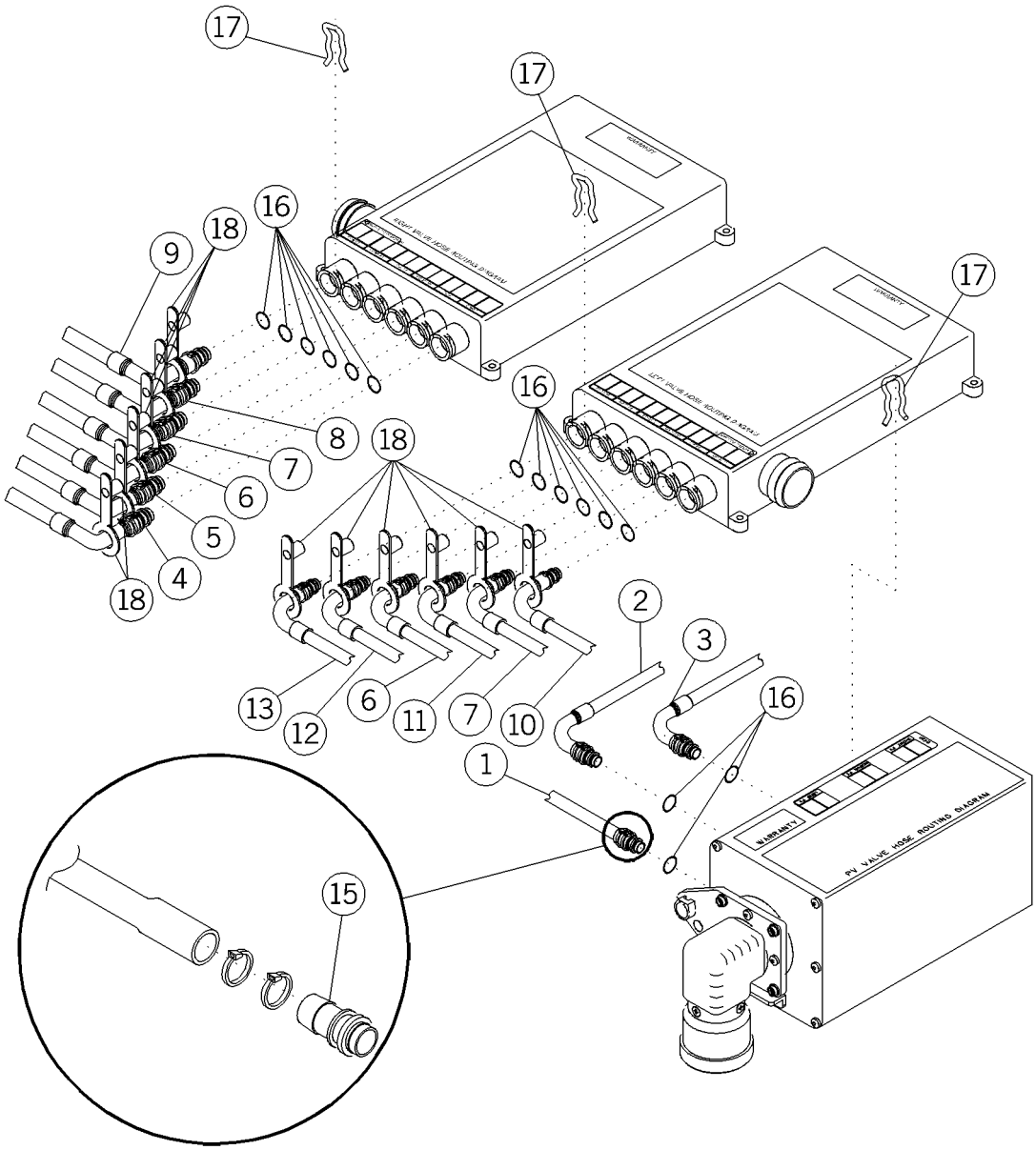

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Table 5-8. Internal Mattress Hose Assembly

Item Number	Part Number	Quantity	Description
1	419-010-0003	1	Hose assembly, long
2	419-010-0004	1	Hose assembly, medium
3	419-010-0005	1	Hose assembly, short
4	419-010-0002	1	Hose assembly, sleep surface chest
5	419-010-0014	1	Hose assembly, vent
6	419-010-0013	2	Hose assembly, boost cushion
7	419-010-0010	2	Hose assembly, working cushion
8	419-010-0015	1	Hose assembly, sleep surface head
9	419-010-0037	1	Cradle hose assembly
10	419-010-0011	1	Hose assembly, working seat
11	419-010-0034	1	Hose assembly, working cushion head
12	419-010-0006	1	Hose assembly, sleep surface foot
13	419-010-0007	1	Hose assembly, sleep surface seat
14			
15	619-100-0005	15	Fitting, hose barb quick disconnect
16	150-002-0060	15	O-ring
17	619-040-0004	15	Clip, valve quick disconnect
18	619-100-0022	12	Plug, cushion

V-CUE™ Dynamic Air Therapy® Unit—P540A60, P540A77, P540A83, and P540A84

Figure 5-9. V-CUE™ Dynamic Air Therapy® Unit—P540A060, P540A77, P540A83, and P540A84

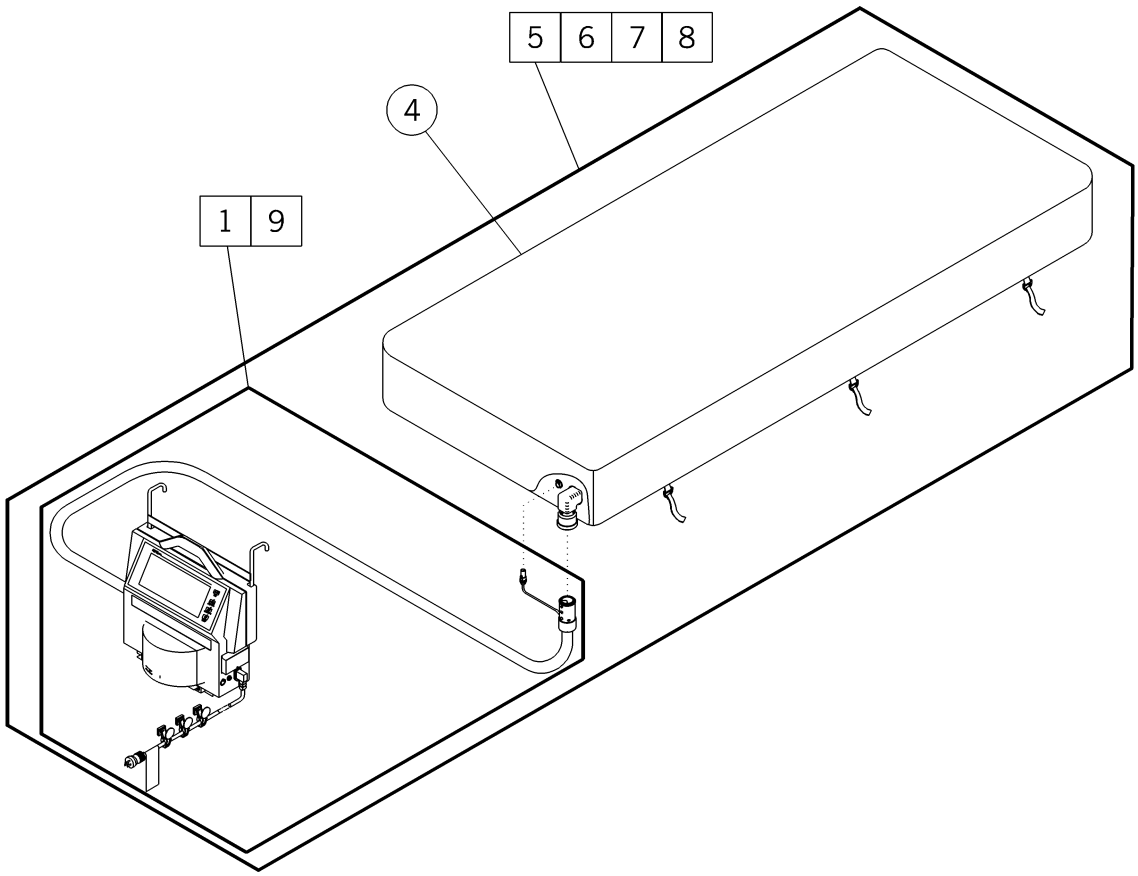

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Table 5-9. V-CUE™ Dynamic Air Therapy® Unit—P540A60, P540A77, P540A83, and P540A84

Item Number	Part Number	Quantity	Description
1	419-030-0005	1	Hose assembly air supply (120V model only)
2			
3			
4	Reference only	1	Mattress assembly
5	Reference only	1	Assembly (120V model only)
6	Reference only	1	Assembly (International) (120V model only)
7	Reference only	1	Assembly (Australian) (120V model only)
8	Reference only	1	Assembly (International) (230V model only)
9	419-030-0036	1	Air supply/hose assembly (International) (230V model only)

Air Supply Hose—P451A05

Figure 5-10. Air Supply Hose—P451A05

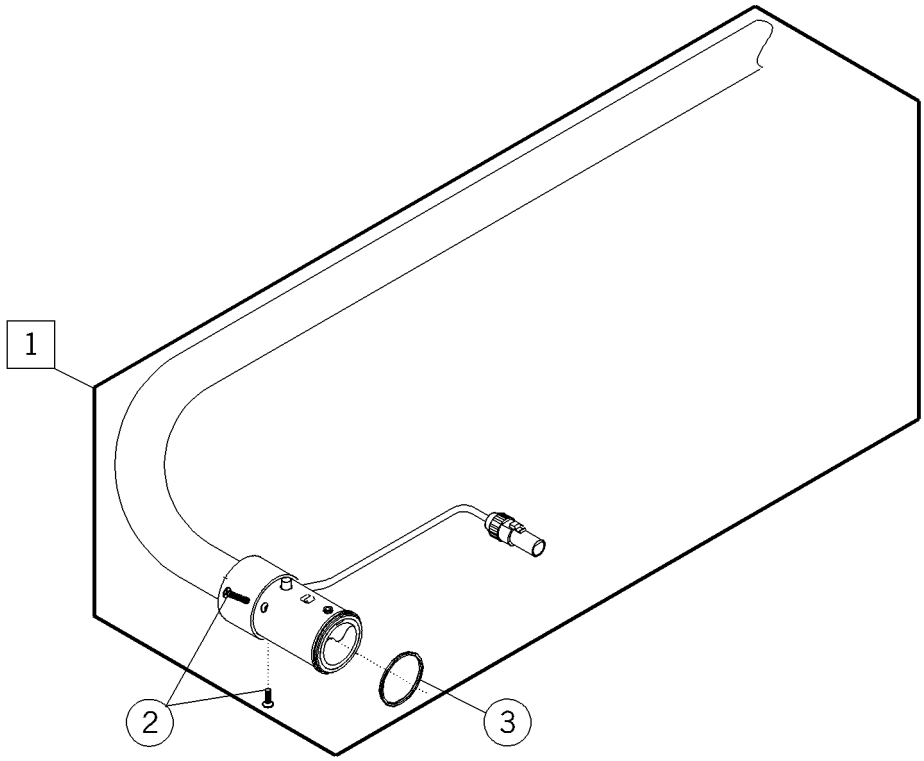

Table 5-10. Air Supply Hose—P451A05

Item Number	Part Number	Quantity	Description
1	419-030-0005 ***	1	Air supply hose assembly
2	Reference only	6	Screw, #6—32 x 3/8"
3	150-002-0054	2	O-ring

*** This is a Return Goods Authorization (RGA) part.

Percussion/Vibration Front Cover Assembly

Figure 5-11. Percussion/Vibration Front Cover Assembly

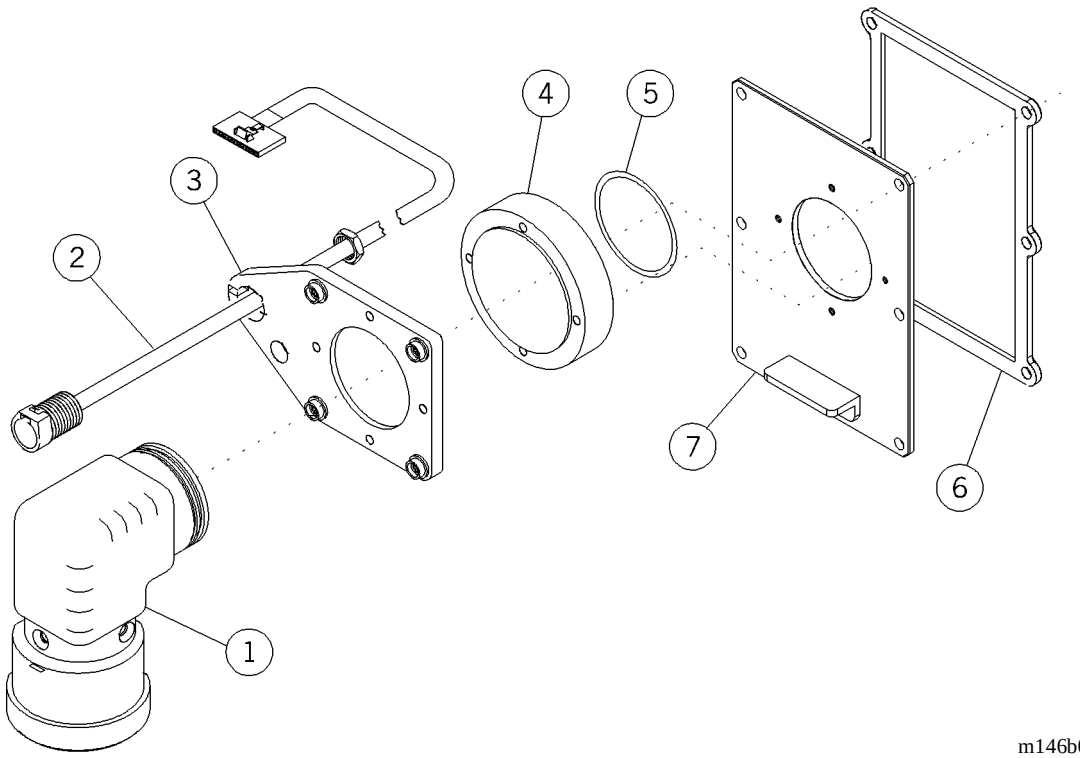

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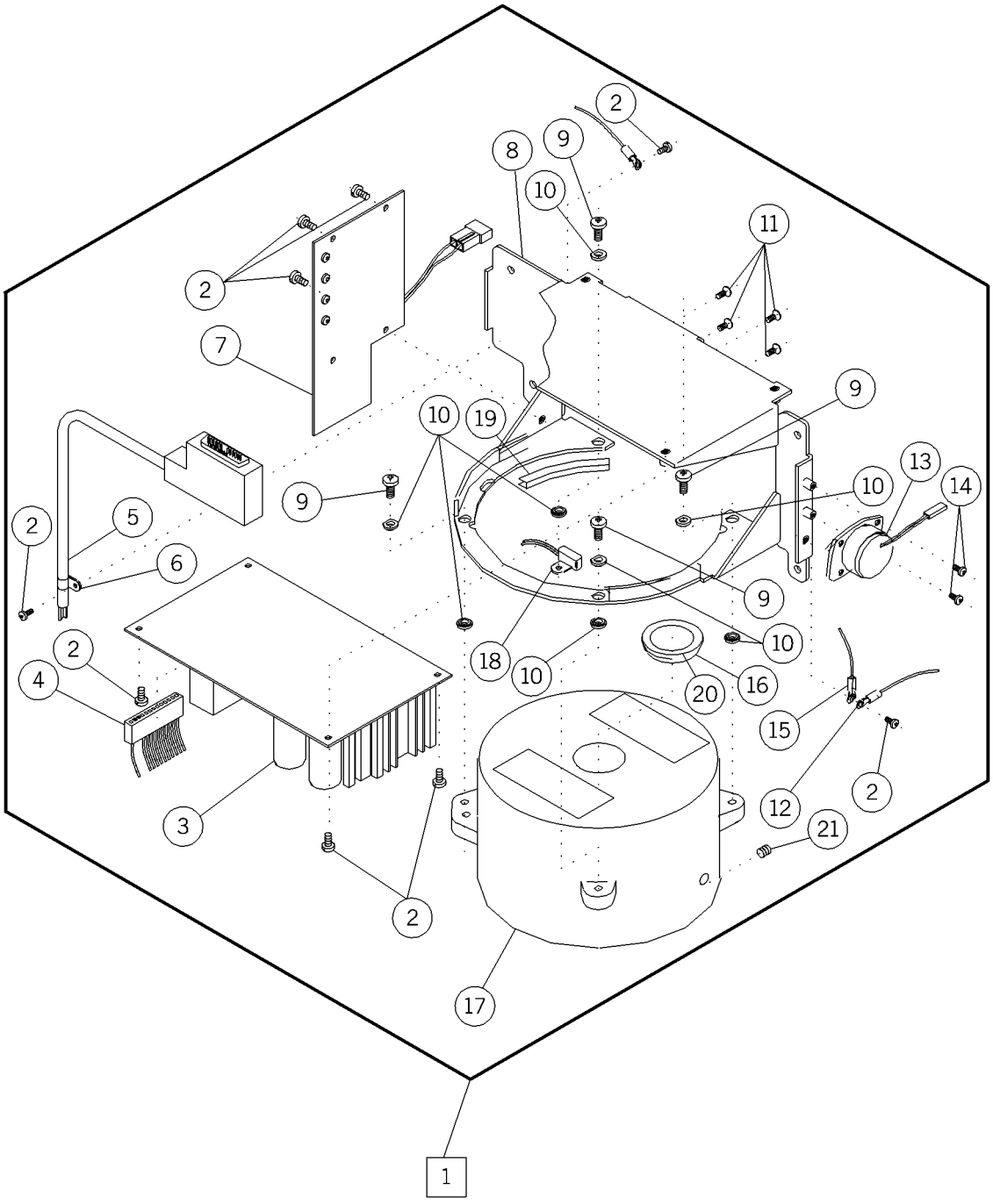
Table 5-11. Percussion/Vibration Front Cover Assembly

Item Number	Part Number	Quantity	Description
1	419-010-0038	1	Elbow assembly without cover
2	419-020-0002	1	Cable, interface
3	Reference only	1	Interface plate/snap assembly
4	719-120-0022	1	Spacer, elbow
5	150-002-0067	1	O-ring, 1.864" inner diameter x 2.004" outer diameter
6	150-003-0065	1	Gasket, machined housing—percussion/ vibration valve
7	Reference only	1	Front percussion/vibration valve cover assembly

Blower/Bracket Assembly (120V Model Only)

Figure 5-12. Blower/Bracket Assembly (120V Model Only)



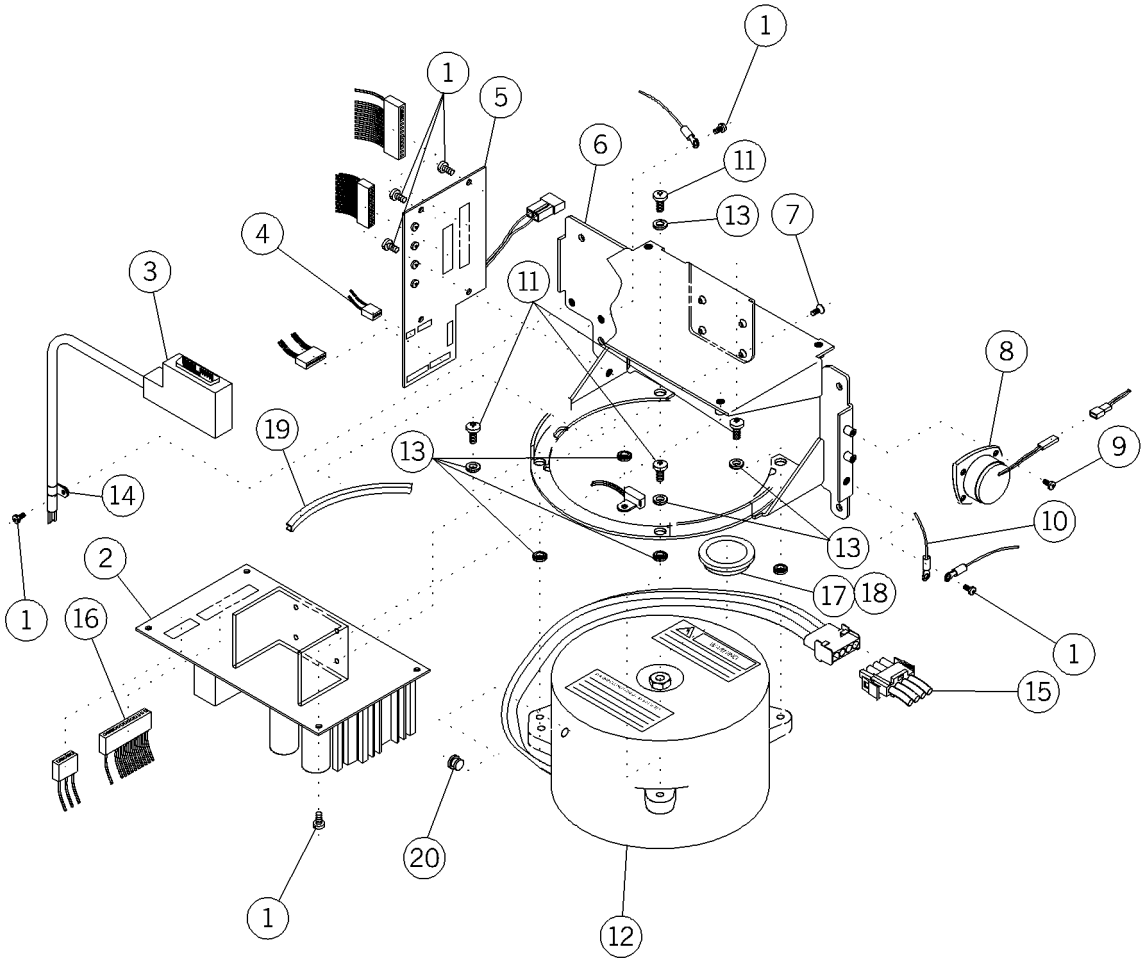
m146b011

Table 5-12. Blower/Bracket Assembly (120V Model Only)

Item Number	Part Number	Quantity	Description
1	419-030-0006	1	Blower/bracket assembly
2	001-031-0025	10	Screw, #6—32 x ¼" pan head
3	030-007-0018	1	Power supply, switching
4	419-020-0023	1	Cable, power supply output
5	419-020-0008	1	Control panel cable assembly
6	030-020-0010	1	Clamp, cable, 5/16", plastic
7	030-015-0079	1	P.C. board, battery charger
8	619-020-0001	1	Bracket, blower
9	001-033-0018	4	Screw, sems, #10—32 x ½"
10	001-021-0006	8	Washer, shoulder
11	001-035-0002	4	Screw, 3 mm x 0.5 mm x 8 mm
12	419-020-0022	1	Cable, blower/power
13	419-020-0003	1	Beeper cable assembly
14	001-030-0012	2	Screw, machine #4—40 x ½"
15	419-020-0004	1	Wire, power supply bracket ground
16	719-120-0018	1	Orifice, blower
17	030-017-0024	1	Blower
18	419-020-0005	1	Blower thermistor cable assembly
19	030-050-0085	14.62" (37.13 cm)	Edging, grommet
20	130-006-0002	As required	Sealant, silicone clear
21	150-007-0060	1	Molded bumper

Blower/Bracket Assembly (230V Model Only)

Figure 5-13. Blower/Bracket Assembly (230V Model Only)



m146b090

Table 5-13. Blower/Bracket Assembly (230V Model Only)

Item Number	Part Number	Quantity	Description
1	001-031-0025	10	Screw, #6—32, ¼"
2	030-007-0018	1	Power supply
3	419-020-0008	1	Control panel cable assembly
4	419-020-0005	1	Blower thermistor cable assembly
5	030-015-0079	1	P.C. board, battery charger assembly
6	619-020-0001	1	Bracket, blower
7	001-035-0002	4	Screw, 3 mm x 0.5 mm x 8 mm
8	419-020-0003	1	Beeper cable assembly
9	001-030-0012	2	Screw, #4—40 x ½" pan head
10	419-020-0004	1	Wire, power supply bracket ground
11	001-033-0018	4	Screw, sems, #10—32 x ½", steel
12	030-017-0026	1	Blower, 230V
13	001-021-0006	8	Washer, shoulder
14	030-020-0010	1	Clamp, cable
15	419-020-0026	1	230V power entry/breaker assembly
16	419-020-0023	1	Cable, power supply output
17	719-120-0018	1	Orifice, blower
18	130-006-0002	As required	Sealant, silicone
19	030-050-0085	14.62" (37.13 cm)	Edging, grommet
20	150-007-0060	1	Molded bumper

Cradle Hose Assembly

Figure 5-14. Cradle Hose Assembly

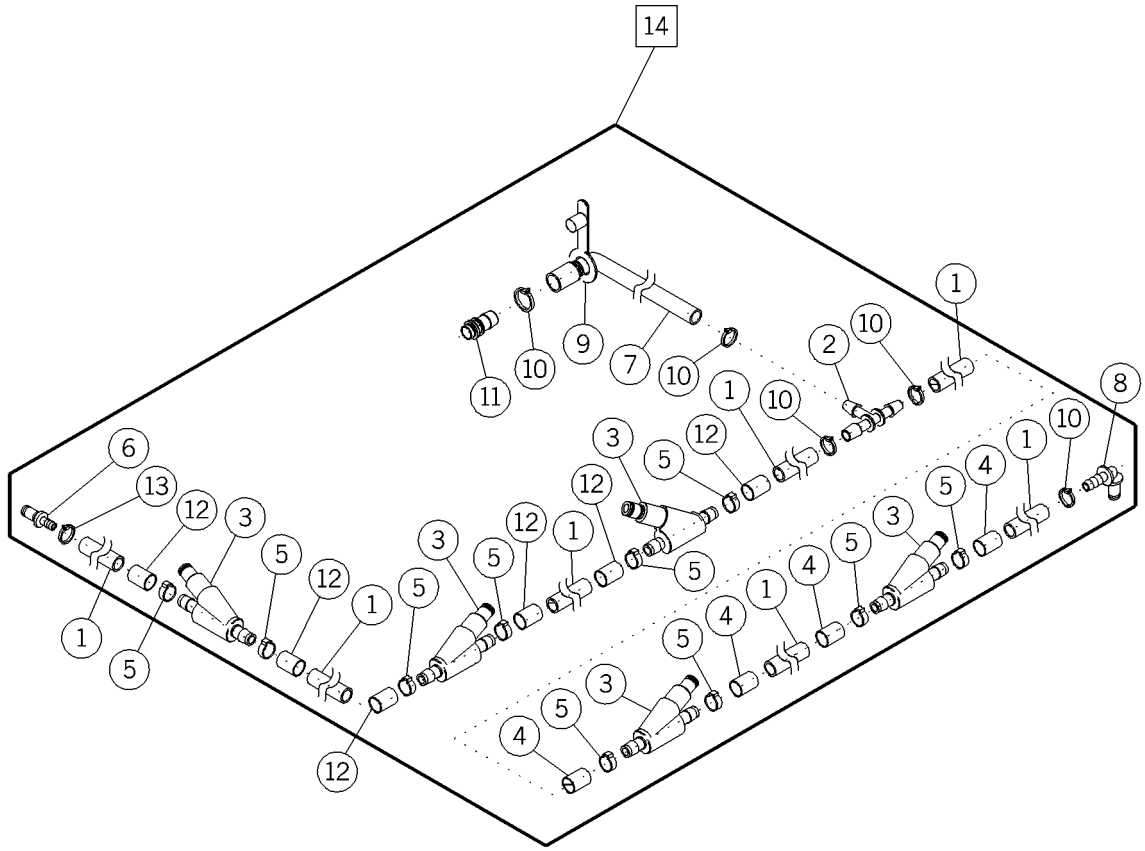


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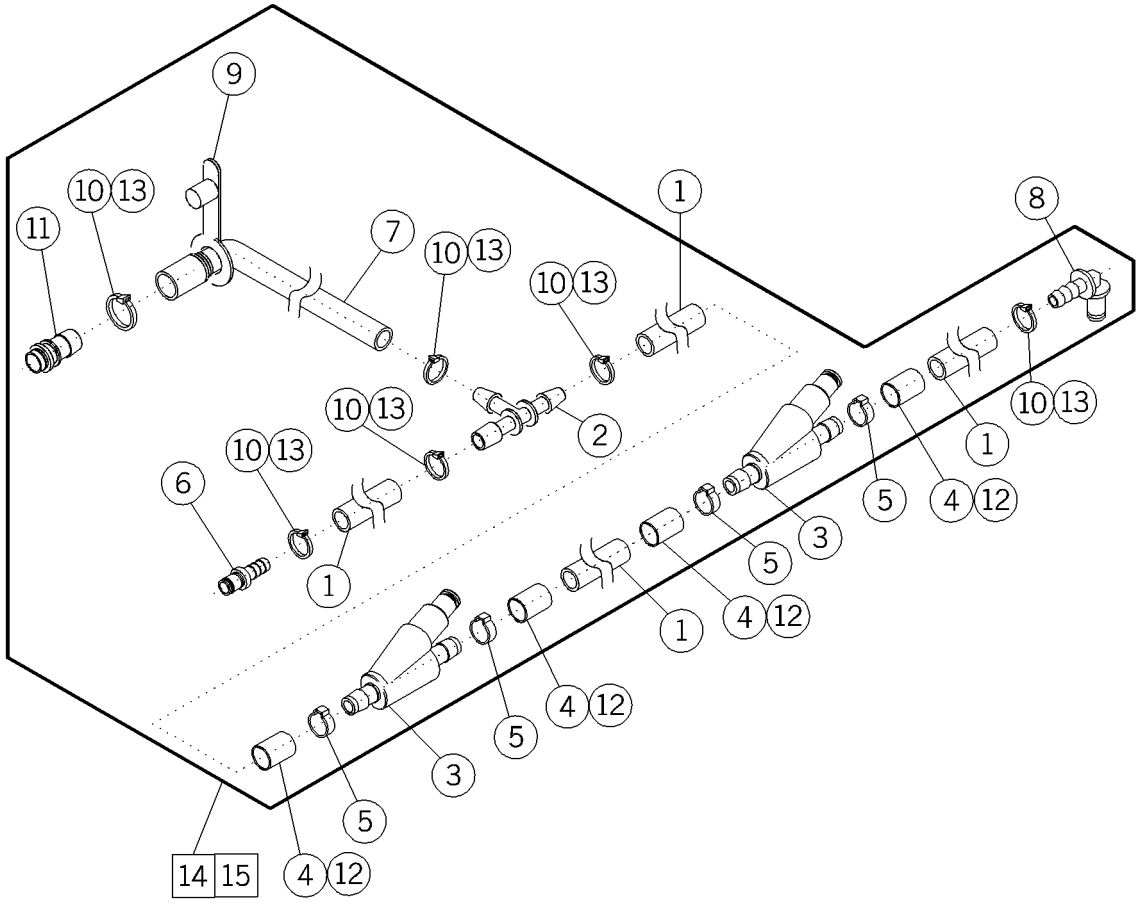
Table 5-14. Cradle Hose Assembly

Item Number	Part Number	Quantity	Description
1	150-005-0209	191.5" (486.4 cm)	Tubing—PVC 0.31" inner diameter x 0.5" outer diameter
2	160-004-0050	1	Fitting, “T” 3/8" hose
3	419-010-0017	5	Fitting, “Y” adapter assembly
4	030-004-0040	6" (15 cm)	Heat shrink—red ¾"
5	001-005-0034	10	Clamp
6	160-004-0028	1	Fitting
7	150-005-0197	1	Tube, cradle 3 7/8"
8	160-004-0019	1	Fitting
9	619-100-0022	1	Plug, cushion
10	030-050-0097	5	Ty-wrap
11	619-100-0005	1	Fitting, hose barb quick disconnect
12	030-004-0036	4" (10 cm)	Heat shrink—green 3¾"
13	030-004-0029	1	Ty-wrap, green
14	419-010-0037	1	Cradle hose assembly

Sleep Surface Bolster Hose Assembly

Figure 5-15. Sleep Surface Bolster Hose Assembly



NOTE:
Right sleep surface bolster hose assembly shown.

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Table 5-15. Sleep Surface Bolster Hose Assembly

Item Number	Part Number	Quantity	Description
1	150-005-0210	92.5" (234.9 cm) or 69.5" (176.5 cm)	Tubing—PVC 3/8" inner diameter x ½" outer diameter
2	160-004-0050	1	Fitting, “T” 3/8" hose
3	419-010-0017	2	Fitting, “Y” adapter assembly
4	030-004-0040	4	Heat shrink—red ¾" (right sleep surface bolster hose assembly only)
5	001-005-0031	4	Clamp
6	160-004-0028	1 or 2	Fitting
7	150-005-0193	1	Tube, short PVC
8	160-004-0019	1	Fitting (right sleep surface bolster hose assembly only)
9	619-100-0022	1	Plug, cushion
10	030-050-0097	6	Ty-wrap (red) (right sleep surface bolster hose assembly only)
11	619-100-0005	1	Fitting, hose barb quick disconnect
12	030-004-0036	4	Heat shrink—green ¾" (left sleep surface bolster hose assembly only)
13	030-050-0094	1	Ty-wrap (green) (left sleep surface bolster hose assembly only)
14	419-010-0009	1	Hose assembly, cradle (right sleep surface bolster hose assembly)
15	419-010-0008	1	Left sleep surface bolster hose assembly

Percussion/Vibration Valve Assembly

Figure 5-16. Percussion/Vibration Valve Assembly

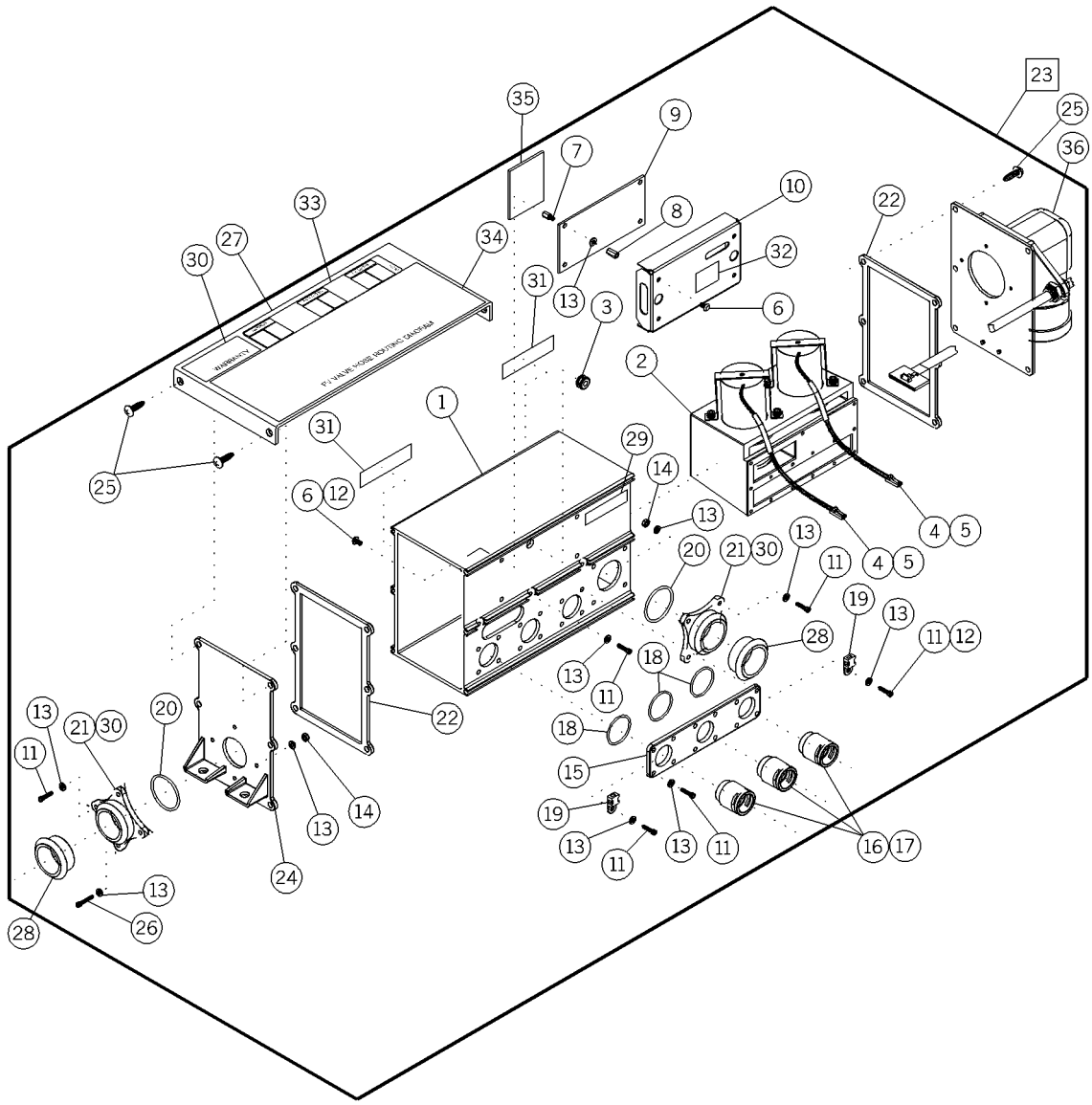

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Table 5-16. Percussion/Vibration Valve Assembly

Item Number	Part Number	Quantity	Description
1	Reference only	1	Valve housing, machined—percussion/ vibration valve
2	Reference only	1	Percussion/vibration valve midsection assembly
3	Reference only	1	Grommet, 3/16" inner diameter
4	Reference only	4	Contact, receptacle
5	Reference only	2	Housing two-connector
6	001-031-0086	8	Screw, #6-32 x 1/4"
7	Reference only	4	Standoff, hex/male/female
8	Reference only	4	Standoff, 1/4" hex x 0.38 long
9	030-015-0077	1	Solenoid board assembly
10	Reference only	1	Cover, P.C. card—percussion/vibration valve
11	Reference only	22	Screw, #6-32 x 5/8", stainless steel
12	Reference only	As required	Adhesive, Loctite®[a] #242-31
13	Reference only	35	Washer, flat #6, stainless steel
14	Reference only	8	Washer, #6-32 stainless steel
15	Reference only	1	Mounting plate, quick disconnect—percussion/vibration valve
16	Reference only	3	Quick disconnect fitting
17	Reference only	As required	Adhesive
18	Reference only	3	O-ring, large
19	Reference only	2	Mount, tie anchor
20	Reference only	2	O-ring, 1 1/4" inner diameter x 1 7/16" outer diameter x 3/32"
21	Reference only	2	Adapter, flanged—percussion/vibration valve
22	150-003-0065	2	Gasket, machined housing—percussion/ vibration valve

a. Loctite® is a registered trademark of Loctite Corporation.

Item Number	Part Number	Quantity	Description
23	419-030-0078 ***	1	Valve assembly percussion/vibration
24	Reference only	1	Cover, rear—percussion/vibration valve
25	Reference only	12	Screw, #10 x 5/8", type B, stainless steel
26	Reference only	1	Screw, #6-32 x ¾"
27	Reference only	1	Heat shield, percussion/vibration valve assembly
28	719-120-0020	2	Fitting, percussion/vibration valve
29	Reference only	1	Label, percussion/vibration valve serial
30	Reference only	1	Label, control/percussion/vibration warranty
31	060-001-0642	2	Label, modification 172
32	Reference only	1	Label, solenoid board modification
33	060-001-0568	1	Label, percussion/vibration valve
34	060-001-0610	1	Label, percussion/vibration valve hose diagram
35	030-050-0105	1	Pad, heat sink
36	419-030-0053	1	Elbow, percussion/vibration front cover assembly

*** This is a Return Goods Authorization (RGA) part.

Control Panel Assembly

Figure 5-17. Control Panel Assembly

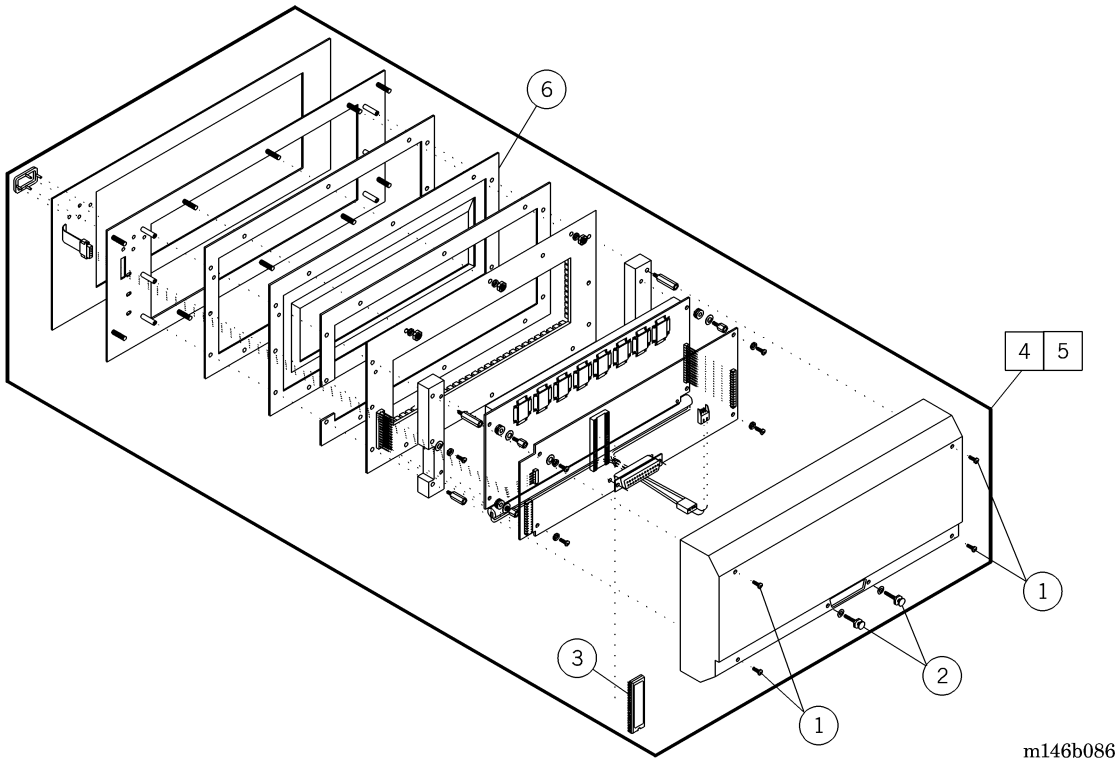


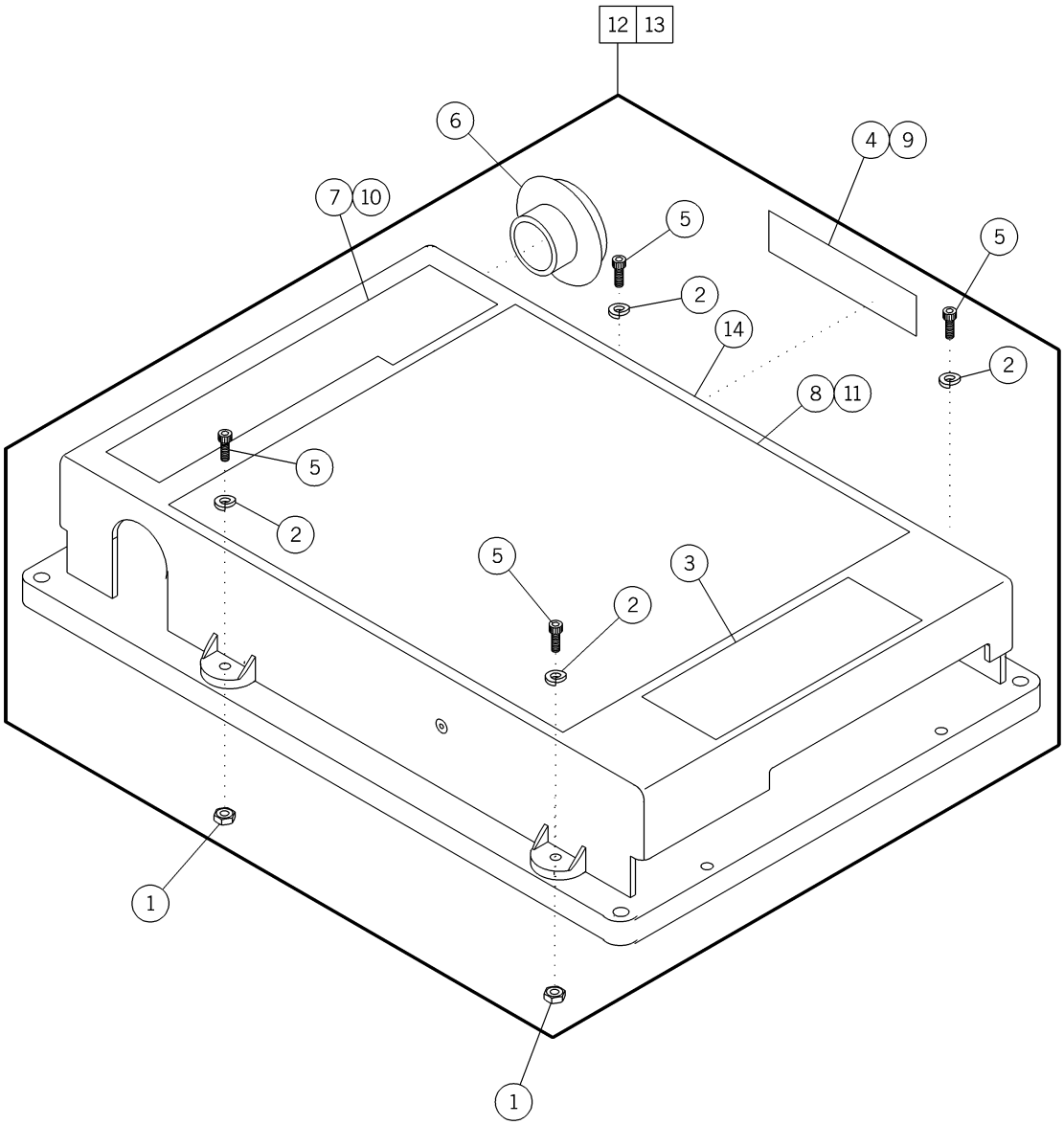
Table 5-17. Control Panel Assembly

Item Number	Part Number	Quantity	Description
1	Reference only	4	Screw, #4—40 x 3/8"
2	Reference only	2	Post, locking, slide latch
3	030-034-0037	1	EPROM, control
4	419-030-0004 ***	1	Control panel assembly (120V model only)
5	Reference only	1	Control panel assembly (230V model only)
6	419-010-0022	1	Bezel, control panel

*** This is a Return Goods Authorization (RGA) part.

Proportional Valve Assembly

Figure 5-18. Proportional Valve Assembly



NOTE:
Right proportional valve assembly shown.

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Table 5-18. Proportional Valve Assembly

Item Number	Part Number	Quantity	Description
1	Reference only	4	Nut, #6-32 x ½" stainless steel
2	Reference only	18	Washer, lock helical #6, stainless steel
3	Reference only	1	Label, control/percussion/vibration warranty
4	Reference only	1	Label, right valve serial (right proportional valve assembly only)
5	Reference only	4	Screw, #6-32 x ½" stainless steel
6	719-120-0021	1	Control valve fitting
7	060-001-0566	1	Label, right proportional valve (right proportional valve assembly only)
8	060-001-0609	1	Label right valve hose diagram (right proportional valve assembly only)
9	Reference only	1	Label, left valve serial (right proportional valve assembly only)
10	060-001-0567	1	Label, left proportional valve (left proportional valve assembly only)
11	060-001-0608	1	Label, left valve hose diagram (left proportional valve assembly only)
12	419-030-0076 ***	1	Proportional valve right
13	419-030-0077 ***	1	Proportional valve left
14	419-030-0040	1	Cover assembly

*** This is a Return Goods Authorization (RGA) part.

Labels

Figure 5-19. Labels

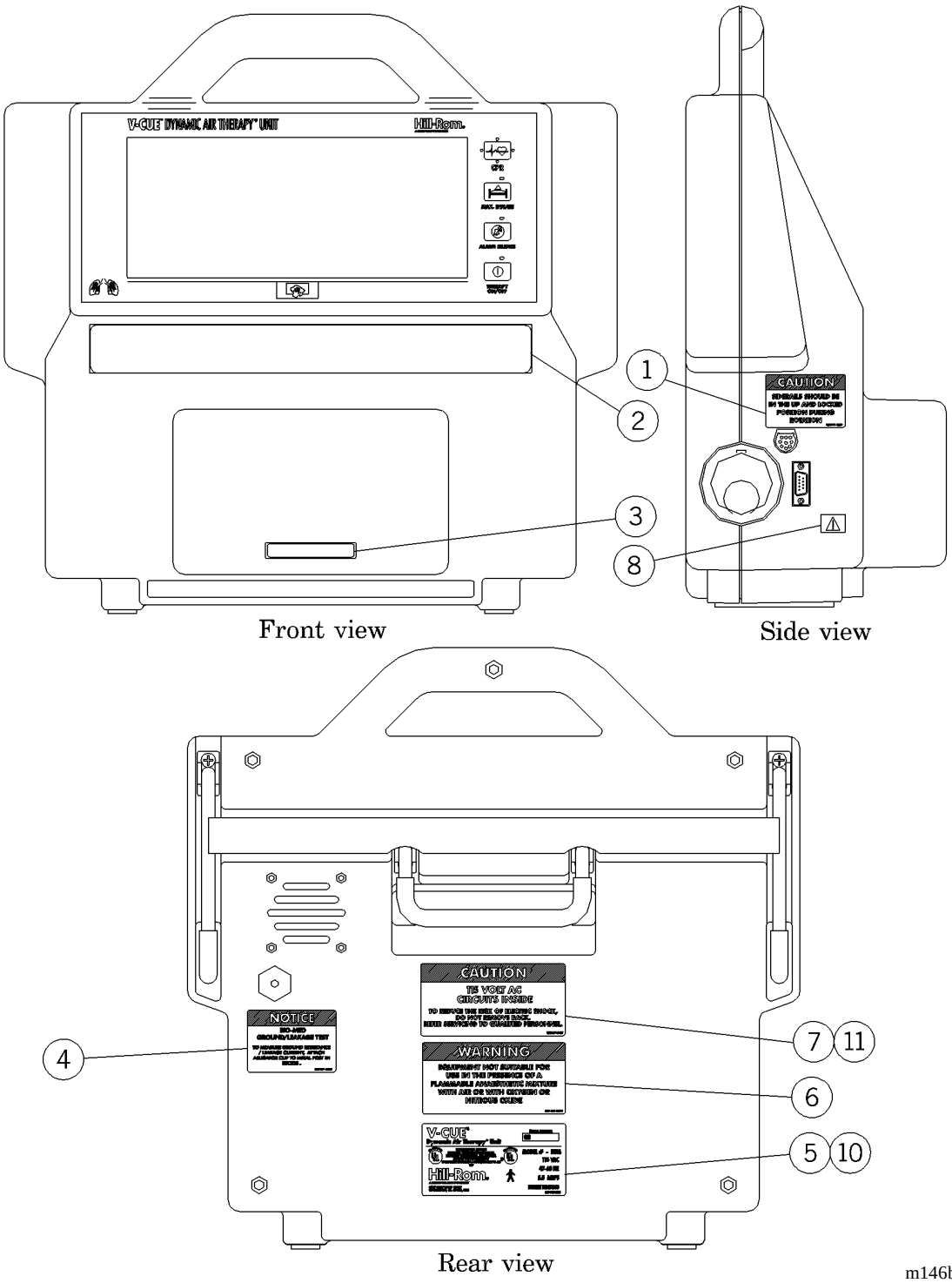

Table 5-19. Labels

Item Number	Part Number	Quantity	Description
1	060-001-0360	1	Siderail label, caution
2	060-001-0443	1	Label, V-CUE™ Dynamic Air Therapy® Unit
3	060-001-0444	1	Label, manual
4	060-001-0556	1	Bio-med grounding label
5	060-003-0046	1	Data plate (120V model only)
6	060-001-0578	1	Label, anesthetics warning
7	060-001-0477	1	Label, voltage caution (120V model only)
8	060-001-0438	1	Label, attention
9			
10	060-003-0048	1	Plate, 230V International data (230V model only)
11	060-005-0003	1	Label, 230V caution (230V model only)

Hanger Assemblies

Figure 5-20. Hanger Assemblies

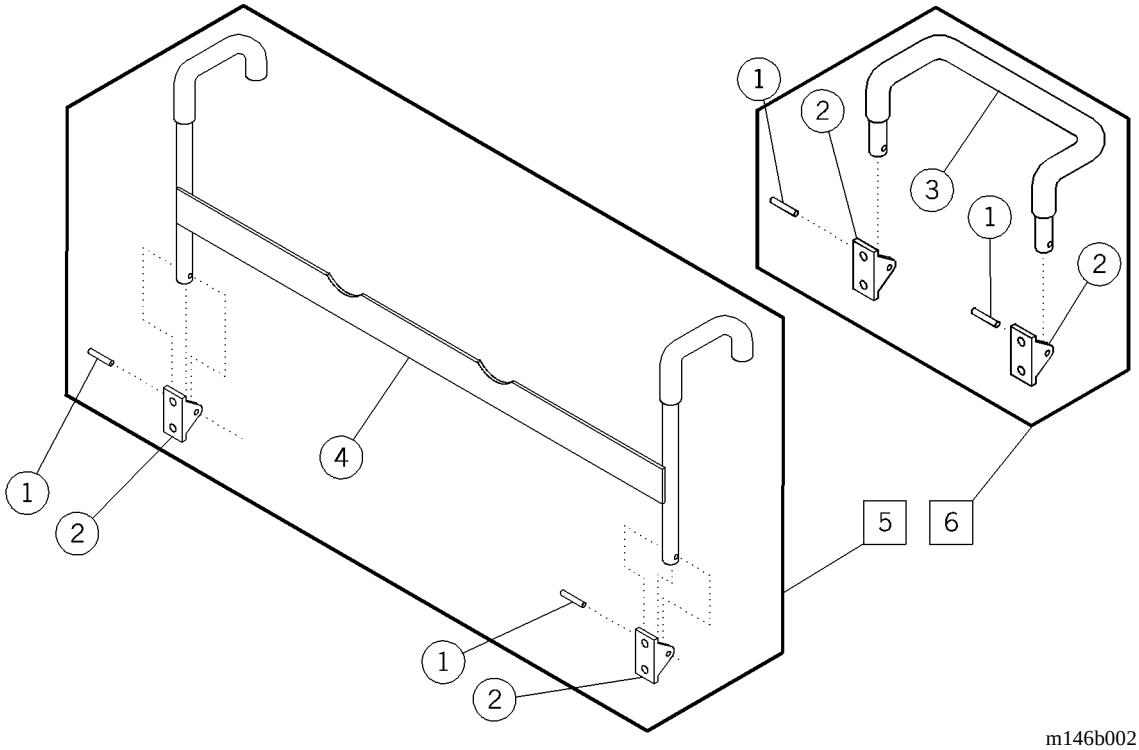

Table 5-20. Hanger Assemblies

Item Number	Part Number	Quantity	Description
1	Reference only	4	Pin, spiral
2	Reference only	4	Bracket, hanger
3	Reference only	1	Hanger, small
4	Reference only	1	Hanger
5	419-010-0001	1	Hanger assembly, large
6	419-010-0018	1	Hanger assembly, small

Transport Case

Figure 5-21. Transport Case

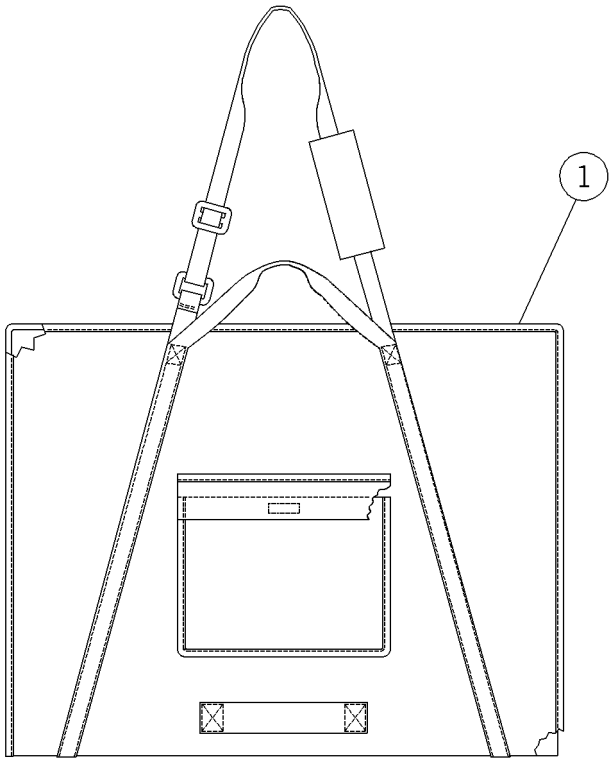

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Table 5-21. Transport Case

Item Number	Part Number	Quantity	Description
1	100-005-0061	1	Case, transport, wine

Cart, Fold-Flat

Figure 5-22. Cart, Fold-Flat

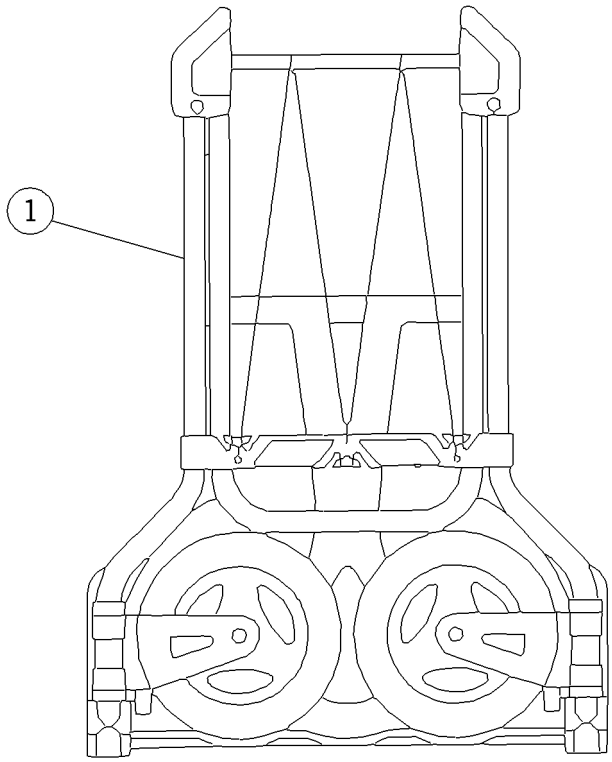

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Table 5-22. Cart, Fold-Flat

Item Number	Part Number	Quantity	Description
1	220-001-0015	1	Cart, fold-flat

Chapter 6
General Procedures

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Cleaning

WARNING:
Follow the product manufacturer's instructions. Failure to do so could result in personal injury or equipment damage.

SHOCK HAZARD:
Unplug the unit from its power source. Failure to do so could result in personal injury or equipment damage.

SHOCK HAZARD:
Do not expose the unit to excessive moisture. Personal injury or equipment damage could occur.

CAUTION:
Do not use harsh cleansers, solvents, or detergents. Equipment damage could occur.

General Cleaning

We recommend that you clean the unit with detergent and warm water. Do not use excessive liquid or harsh cleansers.

Steam Cleaning

Do not use any steam cleaning device on the unit. Excessive moisture can damage mechanisms in this unit.

Cleaning Hard to Clean Spots

To remove difficult spots or stains, we recommend that you use standard household cleansers and a soft bristle brush. To loosen heavy, dried-on soil, you may first need to saturate the spot.

Disinfecting

When there is visible soilage and also between patient use, we recommend that you disinfect the unit using an EPA registered (US only), tuberculocidal, disinfectant.

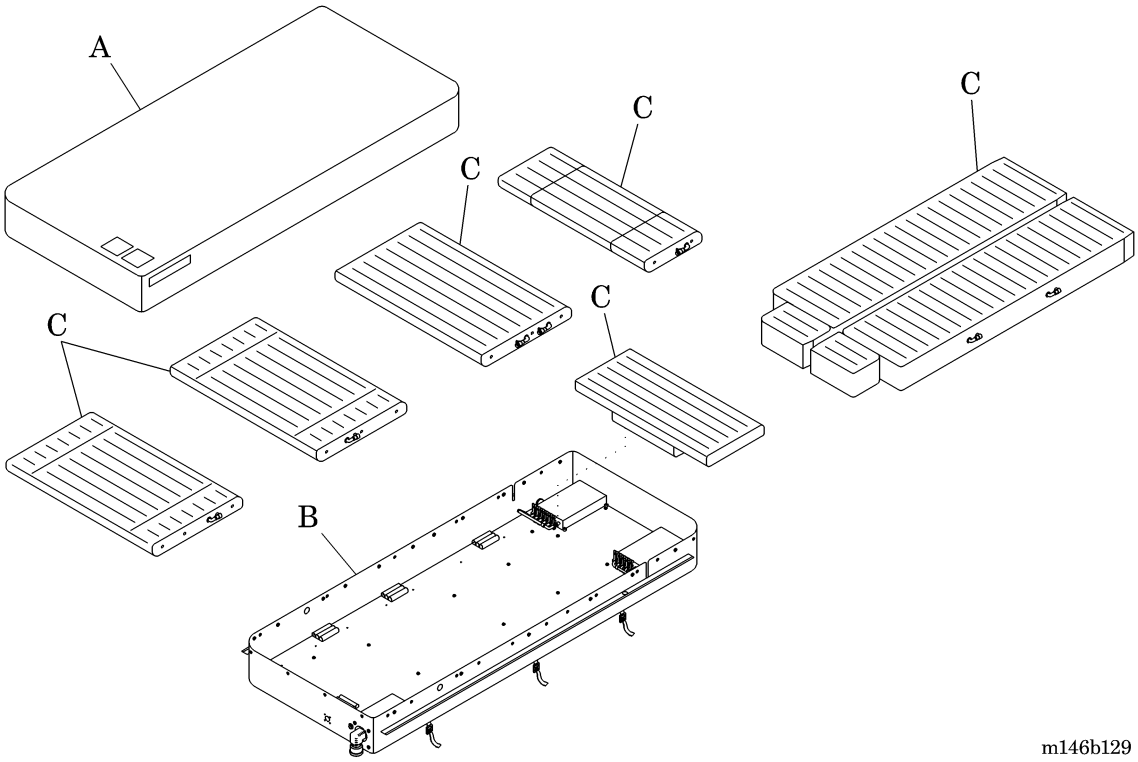
Dilute the disinfectant as specified on the manufacturer's label.

6.1 Mattress Assembly Component Cleaning

CAUTION:
Do not wash the mattress assembly in a washing machine. Washing the entire assembly will damage internal components.

1. Remove the coverlet (A) from the mattress (B) (see figure 6-1 on page 6-4).

Figure 6-1. Mattress Assembly



2. Check the mattress (B) for any visible signs of soiling or staining:
   a. If the mattress (B) is soiled, wipe it with a damp cloth using a facility-approved cleanser/disinfectant, and allow to air dry. Discard the coverlet (A).
   b. If the mattress (B) is not soiled, wipe the coverlet (A) after each use with a damp cloth using a facility-approved cleanser/disinfectant (see "Coverlet Care" on page 6-5).
3. After 5 to 10 minutes, dry the mattress and/or coverlet with a soft cloth.

Coverlet Care

1. Launder heavily-soiled coverlets (A) separately in a washing machine at the highest water level with warm water using any household laundry detergent combined with bleach at a final concentration of 50 ppm to 150 ppm.

2. Air dry or machine dry the coverlet (A) separately on the dryer's lowest heat setting.

3. Remove the coverlet (A) promptly from the dryer.

4. Ensure the coverlet (A) is dry before putting it back on the mattress (B).

5. Zip the coverlet (A) onto the mattress (B).

Cushion Care

If the cushions (C) are visibly soiled, remove, deflate, and return them to the supporting laundry facility for cleaning and disinfecting (refer to procedure 6.6).

Component Handling

CAUTION:
To prevent component damage, ensure that your hands are clean, and **only** handle the P.C. board by its edges.

CAUTION:
When handling electronic components, wear an antistatic strap. Failure to do so could result in component damage.

CAUTION:
For shipping and storage, place the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

P.C. Board

When servicing the P.C. board, follow good handling practices. Mishandling a P.C. board can cause the following:

- P.C. board damage
- Shortened P.C. board life
- Unit malfunctions

Observe the following P.C. board handling rules:

- Ensure that hands are clean and free of moisture, oily liquids, etc.
- **Only** handle the P.C. board by its outer edges.
- Do not touch the P.C. board components. Finger contact with the board surface and/or with its components can leave a deposit that will result in board (and component) deterioration.
- When working with electronics, wear an appropriate antistatic strap, and ensure that it is properly grounded.
- Service the removed P.C. board at a static-free workstation that is properly grounded.
- For shipping and storage, place the removed P.C. board in an antistatic protective bag.

6.2 Pre-Installation Maintenance (PIM)

WARNING:
Adhere to the *Infection Control Policies and Procedures* from Hill-Rom. Failure to do so could result in the spread of infection.

WARNING:
The siderail position sensors and head of bed sensor contain glass-encapsulated mercury. Dispose of these sensors in accordance with local environmental regulations. Ensure the sensors are serviced or replaced only by properly trained service technicians. Failure to do so could release the encapsulated material. In case of a release, adhere to the proper mercury clean-up procedure as specified by the local regulating authority.

WARNING:
Dispose of the battery in accordance with the proper disposal procedure as specified by the local environmental regulations. Failure to do so could result in personal injury.

Perform the Pre-Installation Maintenance (PIM) procedure each time the V-CUE™ Dynamic Air Therapy® Unit is removed from a facility. The purpose of the PIM is to ensure that the unit is in optimum condition for the next patient.

1. Follow the steps on the Removal form, filling it out as you perform the PIM.
2. After all steps are complete, sign the form.
3. Keep the mattress and air supply unit together.
4. To ensure that the battery remains charged, plug unit into an appropriate power source.
5. Perform the function test (see “Function Test” on page 6-18).
6. Follow your service location’s policy for recording removals.
7. Once the form is completed, signed, and recorded, file it using your current service location’s policy.

6.3 Routine Maintenance

WARNING:
Adhere to the *Infection Control Policies and Procedures* from Hill-Rom. Failure to do so could result in the spread of infection.

WARNING:
The siderail position sensors and head of bed sensor contain glass encapsulated mercury. Dispose of these sensors in accordance with local environmental regulations. Ensure the sensors are serviced or replaced only by properly trained service technicians. Failure to do so could release the encapsulated material. In case of a release, adhere to the proper mercury clean-up procedure as specified by the local regulating authority.

WARNING:
Dispose of the battery in accordance with the proper disposal procedure as specified by the local regulating authority. Failure to do so could result in personal injury.

At appropriate intervals for the patient's condition or at the caregiver's request, perform the Routine Maintenance (RM) procedure. RM ensures the unit is disinfected and clean during patient use.

WARNING:
Adhere to the *Infection Control Policies and Procedures* from Hill-Rom. Failure to do so could result in the spread of infection.

1. Obtain the *Service Request Form*.

2. To advise of your expected arrival time, contact the customer. Ask that the customer arrange to remove the patient from the unit during the service time (approximately 15 minutes).

NOTE:
To eliminate confusion and ensure safety, follow the standard procedures for handling and cleaning contaminated materials and equipment. For additional information, refer to the *Exposure Control Plan* and *Infection Control Policies and Procedures* from Hill-Rom.

3. Dispose of the customer linen per the caregiver's instructions.

4. Wipe down the air cushion, air supply hose, and air supply unit with the Hill-Rom-approved disinfectant.

5. Inspect the air filter. Clean, or replace if necessary.

6. Inspect the entire length of the power cord for cuts and cracks. If the power cord has been damaged, replace it.

7. Replace the coverlet.

8. After you complete all the steps, follow the service location policy to record completion of the RM procedure including:
   a. Complete and sign the form.
   b. Call the completion of the RM into the Customer Care Center.
   c. File the *Service Request Form* in the Equipment Master File.

6.4 Transportation, Setup, and Pickup

Make the V-CUE™ Dynamic Air Therapy® Unit patient-ready before delivery to the patient's location (see "Pre-Installation Maintenance (PIM)" on page 6-7).

Transportation

Place the patient-ready cushion assembly, power cord, air supply hose, and straps in the transport case. Follow the local practice for securing the transport case and air supply unit in the vehicle.

Setup

WARNING:
Adhere to the *Infection Control Policies and Procedures* from Hill-Rom. Failure to do so could result in the spread of infection.

Perform the setup procedures prior to placing the patient on the unit.

1. Position the mattress assembly on the bed frame with the air hose connection at the foot end of the bed. When placing the mattress assembly on a unit, ensure that all the straps are in place and secured.

2. Prior to installing the coverlet, inspect all pin connectors at the valve assemblies, percussion/vibration valve assembly, and air supply hose for proper connection.

3. Connect the securing straps around the bed frame at the head and foot ends.

4. Place the unit on the floor, or pull out the hanger located on the back of the air supply unit, and hang it on the footboard (be sure to use the correct size of hanger bracket).

5. Connect the air supply hose to the mattress and the air supply unit.

6. Inspect the foot end, interface plate assembly for damage.

7. Ensure all electrical connections are seated properly.

8. Route the cord under the bed or away from traffic.

9. Plug the unit into an appropriate power source. The green indicator light on the side of the air supply unit should come on.

NOTE:
On some models, the head-of-bed sensor should be placed on the patient right to prevent interference with the headboard.

10. Secure the head-of-bed sensor between the mattress and the bed frame.

11. If possible, secure the siderail position sensors. Otherwise, disable the siderail position sensors.

12. Install the encasement.

13. Select a mattress width of either ICU or Med/Surg.

14. If the frame is equipped with a scale, zero the scale.

Patient Set-Up

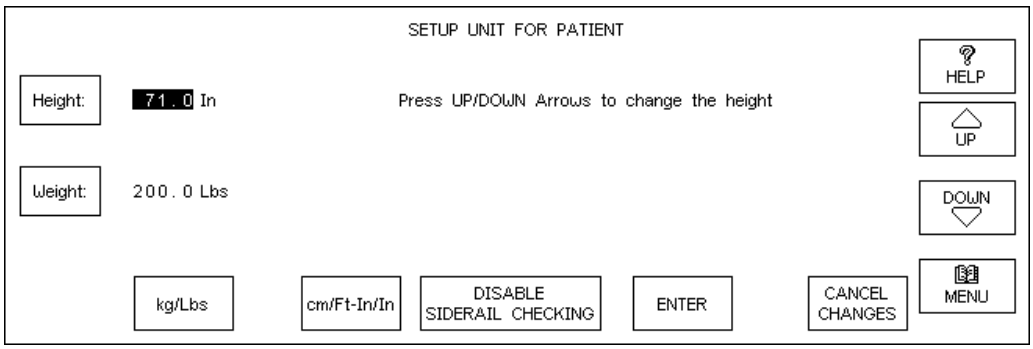
1. Access the Service Menu.

2. At the Diagnostics screen, perform the Valves Test (see “Diagnostics Test Menu” on page 6-19).

WARNING:
Enter the patient’s height and weight on the SETUP UNIT FOR PATIENT screen to ensure proper therapeutic pressure in each zone. Failure to enter the proper parameters could result in patient injury.

3. Set the patient’s height and weight.
   a. Touch SETUP UNIT FOR PATIENT on the Main Menu. The SETUP UNIT FOR PATIENT screen appears (see figure 6-2 on page 6-11):

Figure 6-2. Setup Unit for Patient Screen



m146_073

b. Touch Height until it lights up. Use the up or down arrows to change the information.

NOTE:
If height is displayed in centimeters, you can change it to inches by touching the cm/Ft-In/In button located at the bottom of the screen.

c. Touch Weight until it lights. Use the up or down arrows to change the information.

NOTE:
If the weight is displayed in kilograms (kg), you can change it to pounds (lb) by touching the kg/Lbs button located at the bottom of the screen.

NOTE:
To reset the height and weight information to the previous settings, touch CANCEL CHANGES.

d. After you have entered the data, touch ENTER to apply the statistics.

4. Perform an operational in-service procedure with the customer.

5. After placing the patient on the unit, turn off the Max. Inflate function.

Pickup

WARNING:
Adhere to the *Infection Control Policies and Procedures* from Hill-Rom. Failure to do so could result in the spread of infection.

When picking up a V-CUE™ Dynamic Air Therapy® Unit, perform the following steps in the listed order:

1. Review the History buffer for unit error codes that may denote improper function.

2. Access the Service Options Menu, and go to Diagnostics. Monitor the Valve Information screen for possible unit malfunctions.

3. Remove the coverlet, and place it into a blue polyurethane bag in accordance with the *Infection Control Policies and Procedures* from Hill-Rom.

4. Wipe down the air supply unit, air supply hose, and mattress with an approved disinfectant in accordance with the *Infection Control Policies and Procedures* from Hill-Rom.

5. Inspect all pin connectors at the valve assemblies, percussion/vibration valve assembly, and air supply hose for proper connection.

6. Inspect the foot end, interface plate assembly for damage. Ensure all electrical connections are seated properly.

7. Completely deflate the mattress assembly (refer to procedure 6.6).

8. Place the mattress, power cord assembly, hose assembly, and straps into the transport bag for transport to the service center.

6.5 Software Operational Procedures

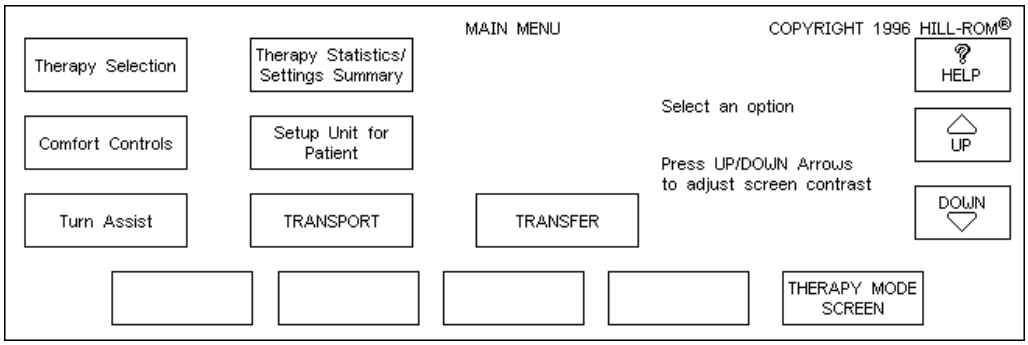
This section describes the Service Options Menu available for setting unit parameters and testing unit functions. A series of help screens are provided throughout the system. If help is available, a touch area appears on the screen.

Service Options Menu

Purpose: The Service Options Menu enables the caregiver to establish operation parameters, adjust the alarm, monitor critical sensor data, adjust cushion pressures, and perform setup procedures.

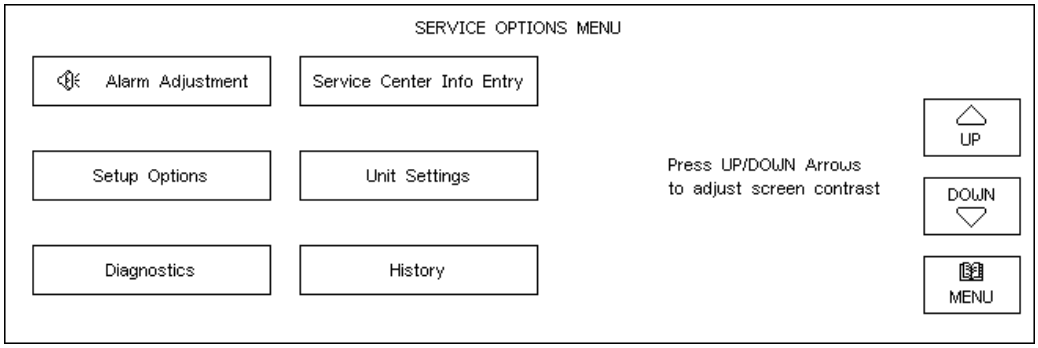
1. To display the Service Options Menu, perform the following:
   a. Access the Main Menu screen.
   b. Touch the areas across the bottom of the Main Menu screen, starting from the left, in the following sequence 2, 4, 3, 1, and 5 (see figure 6-3 on page 6-14).

Figure 6-3. Main Menu Screen



The Service Options Menu screen is displayed (see figure 6-4 on page 6-15).

Figure 6-4. Service Options Menu Screen



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Alarm Adjustment

The Alarm Adjustment selection enables you to set the alarm volume from 1 to 10, the tone from 1 to 5, and the delay between pressing Alarm Silence and the alarm coming on again from 5 to 20 minutes.

Setup Options

On the Setup Options screen, you are able to set the format for the date reading, set the shift start time, and set the shift duration time.

Diagnostics

When you select Diagnostics, you have additional diagnostics choices (see “Diagnostics Menu” on page 6-17).

Service Center Info Entry

With this menu choice, you are able to enter the following parameters: bed number (six characters), consultant’s name (15 characters), technician’s name (15 characters), service center phone (four characters), and patient’s information (15 characters). An additional screen provides an interactive keyboard to make your entries. All entries are stored in unit memory.

Unit Settings

The Unit Settings selection leads to a screen with two choices: Clear Patient Information and Set Clock. The Clear Patient Information choice displays an additional screen with a warning before you can clear patient parameters. The Set Clock function allows you to change the year, month, day, hour, and minute. You can also set a daylight savings parameter.

History

The History function provides a dynamic record of all function changes and unit errors that occur. The History log can store up to 550 entries. You can display 11 entries at a time on the screen. The newest entry is on the top, and the oldest entry is on the bottom.

You can download the history log to a printer or a computer.

1. To download the log, set the external device communication parameters to 9600 baud, 1 stop bit, 8 data bits, no parity, and XON/XOFF flow control.

2. On a computer, use the terminal program to initiate download (see table 6-1 on page 6-16).

Table 6-1. History Buffer Data

History Event	From/STATUS	To/STATUS
Menu change	Old menu	New menu
Valve override	Old valve override	New valve override
Therapy mode	Old therapy mode	New therapy mode
Set therapy weight	Old weight	New weight
Set therapy height	Old height	New height
Active pressures 1-12	Old pressure	New pressure
Alarm sound	Alarm type	Alarm status ON/OFF
Acclimation flag	Old acclimation status	New acclimation status
Comfort zones 1-7	Old setting	New setting
Battery status	Status	Battery voltage
Siderail checking		New status
System error code		Error code

Screen Contrast

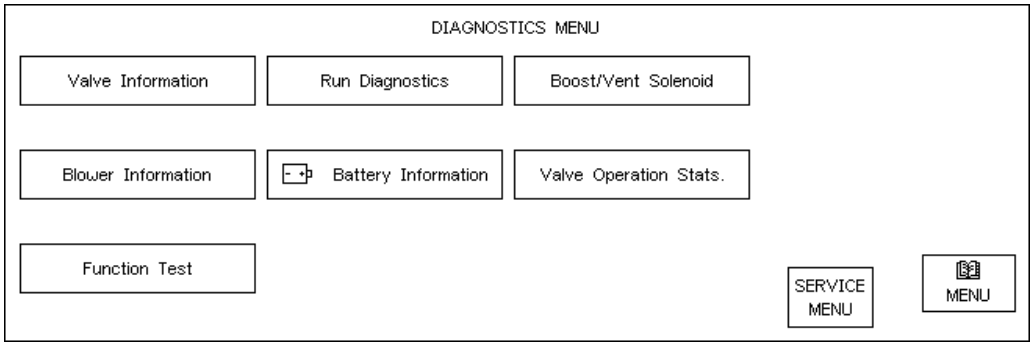
To adjust the screen contrast, press the UP and DOWN arrow keys located along the right-hand side of the screen.

Diagnostics Menu

The Diagnostics Menu enables you to obtain Valve Information, Blower Information, and Battery Information, as well as the Diagnostics Test Menu screen previously discussed.

Touch Diagnostics on the Service Options Menu. The Diagnostics Menu is displayed (see figure 6-5 on page 6-17).

Figure 6-5. Diagnostics Menu Screen



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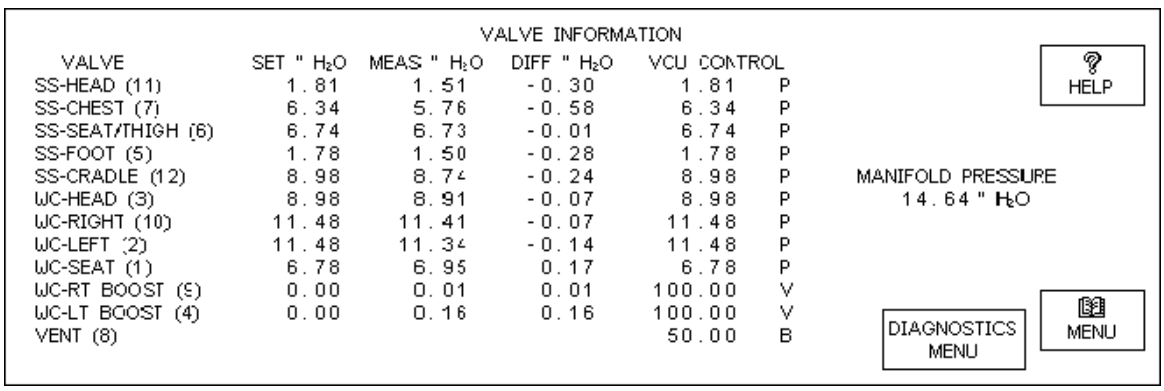
Valve Information

The Valve Information function provides the current status of the proportional valves in the mattress assembly. For a sample of the Valve Information screen, refer to figure 6-6 on page 6-17.

Figure 6-6. VALVE INFORMATION Screen


VALVE INFORMATION
VALVE SET " H2O MEAS " H2O DIFF " H2O VCU CONTROL
SS-HEAD (11) 1.81 1.51 -0.30 1.81 P
SS-CHEST (7) 6.34 5.76 -0.58 6.34 P
SS-SEAT/THIGH (6) 6.74 6.73 -0.01 6.74 P
SS-FOOT (5) 1.78 1.50 -0.28 1.78 P
SS-CRADLE (12) 8.98 8.74 -0.24 8.98 P
WC-HEAD (3) 8.98 8.91 -0.07 8.98 P
WC-RIGHT (10) 11.48 11.41 -0.07 11.48 P
WC-LEFT (2) 11.48 11.34 -0.14 11.48 P
WC-SEAT (1) 6.78 6.95 0.17 6.78 P
WC-RT BOOST (9) 0.00 0.01 0.01 100.00 V
WC-LT BOOST (4) 0.00 0.16 0.16 100.00 V
VENT (8) 50.00 B
HELP
MANIFOLD PRESSURE
14.64 " H2O
DIAGNOSTICS MENU
MENU

m146_077

For each valve, the screen lists the set pressure, the measured pressure, the difference, and the VCU Control. Current manifold pressure is also displayed.

Blower Information

The Blower Information screen shows the blower control voltage, the manifold measured and set pressures, the blower temperature, and the blower install date. When a new blower is installed, use this screen to record the date.

Function Test

This selection automatically runs the following operational sequence:

- Pre-test stabilizing for 10 seconds
- Percussion for 15 seconds at 3 Hz, Intensity 5, patient centered
- Vibration for 15 seconds at 10 Hz, Intensity 5, patient centered
- Vibration for 30 seconds at 15 Hz, Intensity 5, patient full right
- Vibration for 90 seconds at 15 Hz, Intensity 5, patient full left
- OPTI•REST Mode for 2 cycles

The test ends with five beeps. The Function Test should be performed during a Pre-Installation Maintenance procedure.

Battery Information

The Battery Information screen shows the battery voltage with the charger on and the charger off, and the date the battery was placed in operation. When installing a new battery, record the date on this screen.

Boost/Vent Solenoid

This selection shows the status of the vent and boost solenoids including the date the solenoids were installed, the number of cycles in vibration and percussion, and the total number of cycles. When a new vent or boost solenoid is installed, use this screen to record the date.

Valve Operation Stats

This selection shows the total time in operation (in hours) for the left and right valve P.C. boards. When a new left or right valve P.C. board is installed, use this screen to record the date.

Run Diagnostics

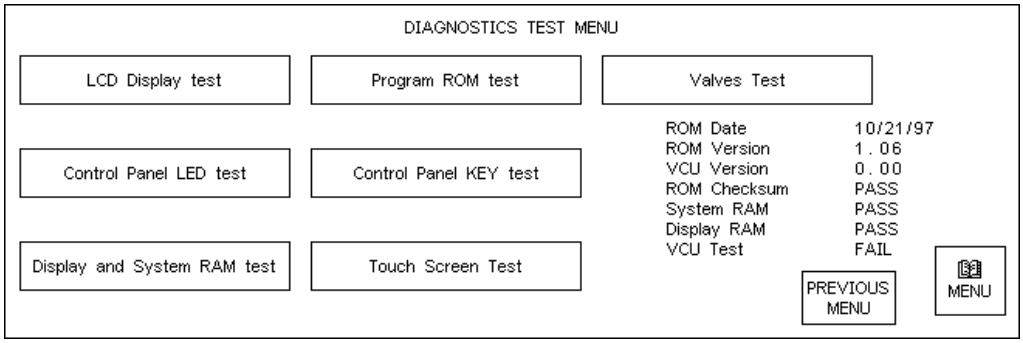
When you select Run Diagnostics on the Diagnostics menu, additional choices are available.

Diagnostics Test Menu

The Diagnostics Test Menu allows you to test performance functions such as Touch Screen, Key Pad for Data Entry, and the Control Panel LEDs.

Touch Run Diagnostics on the Diagnostics menu. The Diagnostics Test Menu is displayed (see figure 6-7 on page 6-19).

Figure 6-7. Diagnostics Test Menu Screen



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NOTE:
If the VCU Test reads FAIL, press the Valves Test button to ensure the valves travel their full length. The VCU Test should then read PASS.

Liquid Crystal Display (LCD) Display Test

This test momentarily clears the display, turns it off, and then returns to the menu. This is a test for consistent, even illumination of the display.

Control Panel LED Test

This is a test to determine whether all control panel LEDs illuminate.

Display and System RAM Test

This test verifies that the system RAM (Random Access Memory) in the control panel is working properly. The menu returns when the test completes.

Program ROM Test

This test verifies that the ROM (Read Only Memory), where the program instructions are stored, is functioning properly. The menu returns when the test completes.

Control Panel Key Test

This is a test of the operation of the four, control panel buttons. When you press a button, the operation is indicated on the screen. The status of the siderail and head-of-bed sensors is also displayed.

Touch Screen Test

Touch Screen is a test of the operations of all areas on the screen. When you touch the screen, the screen coordinates are displayed. To end the test, press the Alarm Silence button.

Valve Test

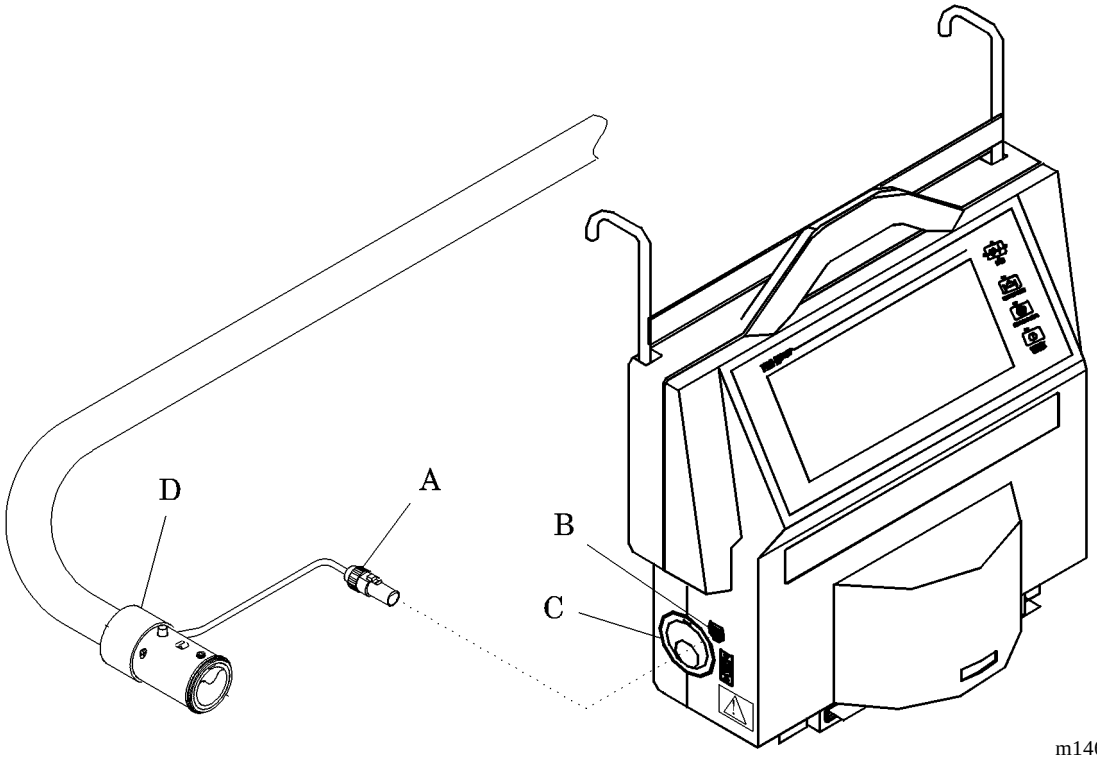
This test ensures that the command and status signals for each valve are operational.

6.6 Cushion Deflation

Tools required: None

1. Ensure the mattress is properly connected to the V-CUE™ Dynamic Air Therapy® Unit.
2. Ensure the V-CUE™ Dynamic Air Therapy® Unit is running. If not, press the Therapy On/Off button located on the front of the unit.
3. Press the Max. Inflate button.
4. Wait until the blower pressure and speed stabilizes.
5. Silence the alarm if necessary.
6. Disconnect the air supply data cable (A) from the receptacle (B) to ensure the valves remain open (see figure 6-8 on page 6-21).

Figure 6-8. Air Supply Cable and Blower Receptacle



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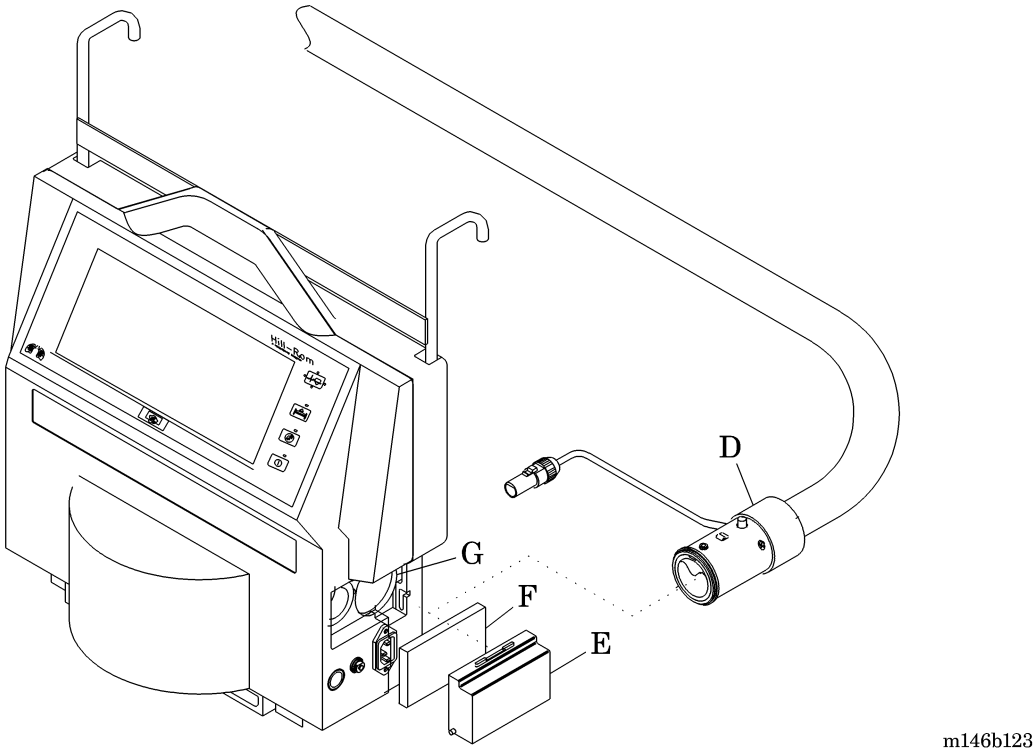
7. Verify that ERROR CODE 315 is displayed.
8. Remove the filter cover (E) and filter (F) (see figure 6-9 on page 6-22).

Figure 6-9. Filter Cover



9. Disconnect the air supply hose (D) and air supply data cable (A) from the blower receptacle (C) (see figure 6-8 on page 6-21).

10. Connect the air supply hose (D) to the air intake (G) (see figure 6-9 on page 6-22).

11. Verify that cushion deflation begins.

12. Wait approximately 5 minutes for the cushions to completely deflate.

13. Turn off the Maximum Inflate function.

14. Press the Therapy On/Off button.

15. Disconnect the air supply hose (D) from the air intake (G).

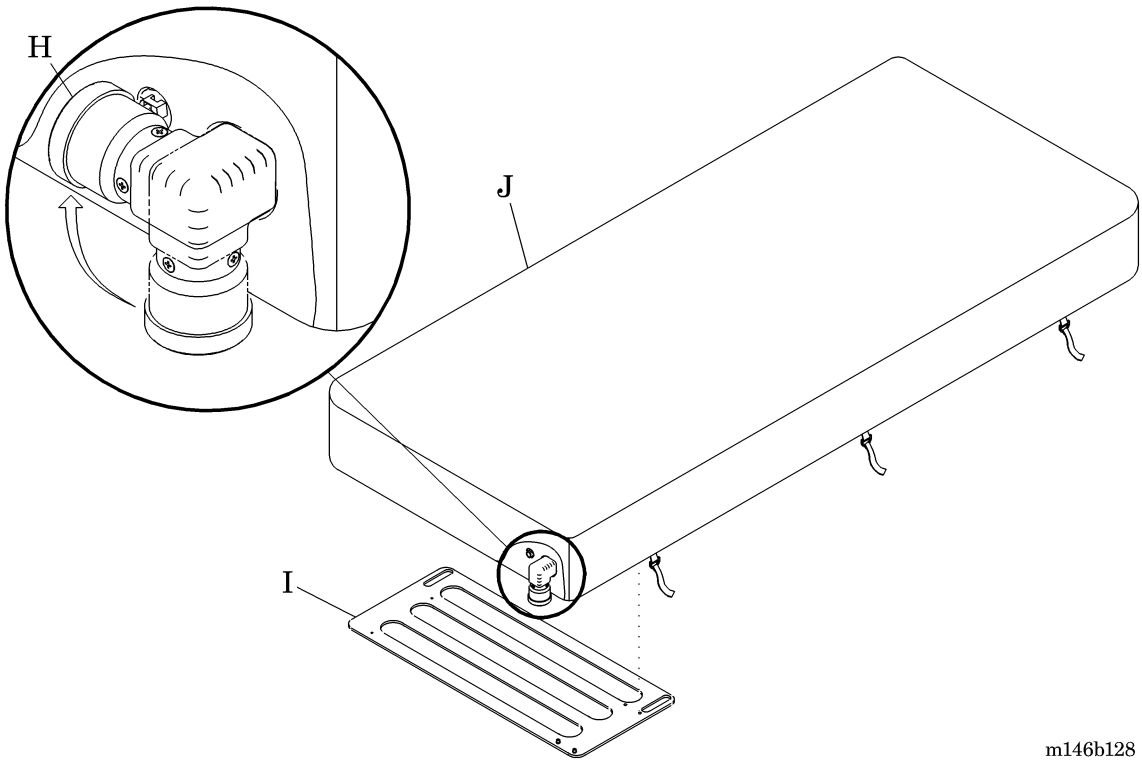
16. Install the filter cover (E) and filter (F).

17. Disconnect the air supply hose (D) from the mattress.

CAUTION:
Turn the percussion/vibration elbow inward and parallel with the foot plate when tri-folding the mattress for transport. Failure to do so could result in equipment damage.

18. Turn the percussion/vibration elbow (H) inward and parallel with the foot plate (I) on the bottom of the mattress (J) (see figure 6-10 on page 6-23).

Figure 6-10. Mattress Assembly



19. Tri-fold the mattress (J).

WARNING:
Adhere to the *Infection Control Policies and Procedures* from Hill-Rom. Failure to do so could result in the spread of infection.

20. Place the mattress (J) into the transport bag in accordance with the *Infection Control Policies and Procedures* from Hill-Rom.

21. Place the air supply hose (D) into the transport bag (see figure 6-9 on page 6-22).

Tool and Supply Requirements

To service the V-CUE™ Dynamic Air Therapy® Unit, the following tools and supplies are required:

- Phillips head screwdriver
- Small screwdriver
- Screwdriver
- 11/32" nut driver
- 6/32" nut driver
- 3/16" nut driver
- 7/16" wrench
- 5/16" wrench
- Needle nose pliers
- Black marker
- Antistatic wrist strap
- Wire cutters or small cable tie cutters
- 7/64" Allen™[1] wrench

1. Allen™ is a trademark of Industrial Fasteners, Inc.

Chapter 7
Accessories

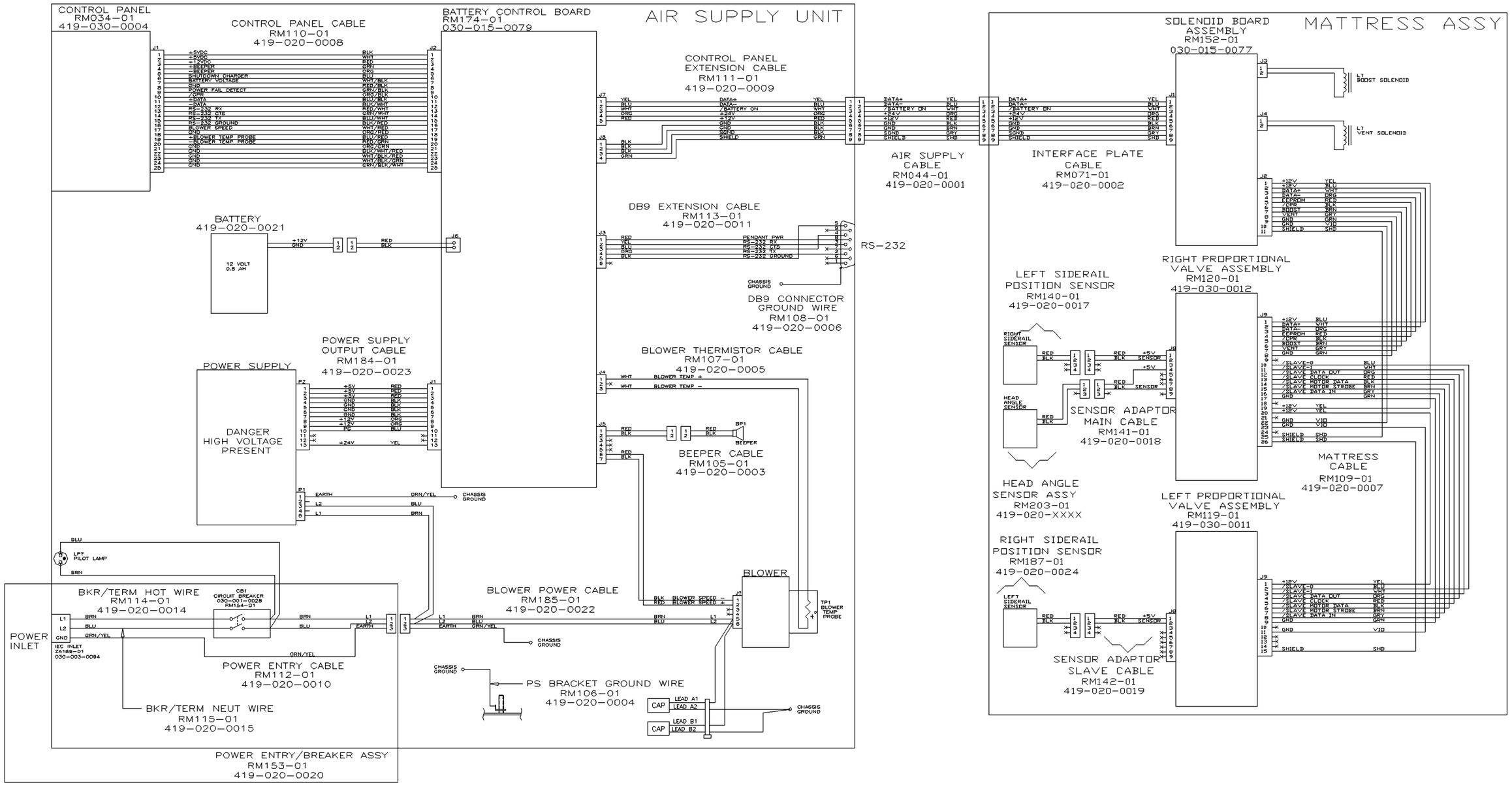
Chapter Contents

There are no accessories for the V-CUE™ Dynamic Air Therapy® Unit.

NOTES:

Schematic Wiring Diagram—Integrated Wiring Diagram (120V Model Only)

Back to Chapter 3



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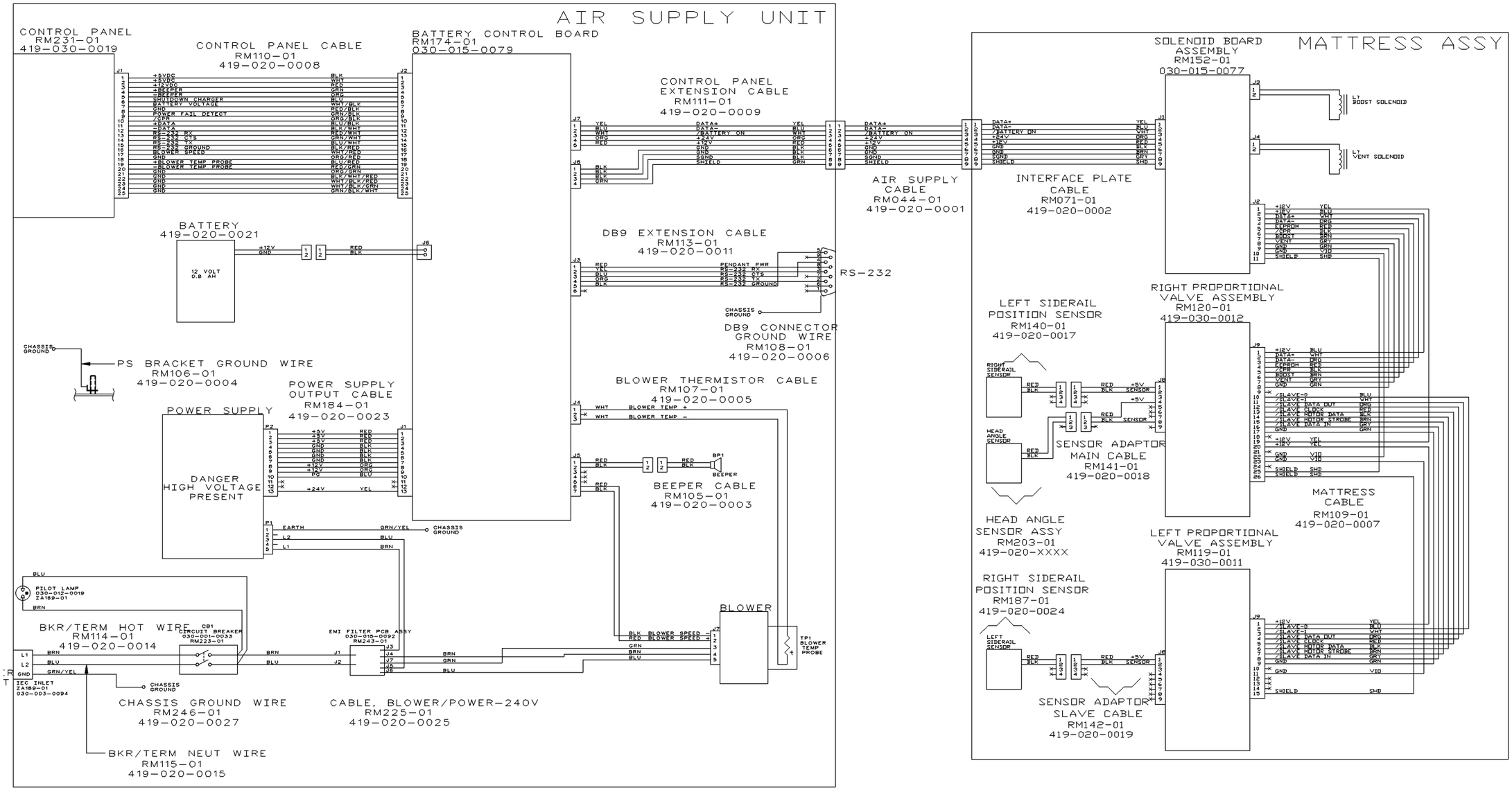
FO 3-1

Schematic Wiring Diagram—Integrated Wiring Diagram (230V Model Only)

Back to Chapter 3



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FO 3-2

Hose Management Diagram

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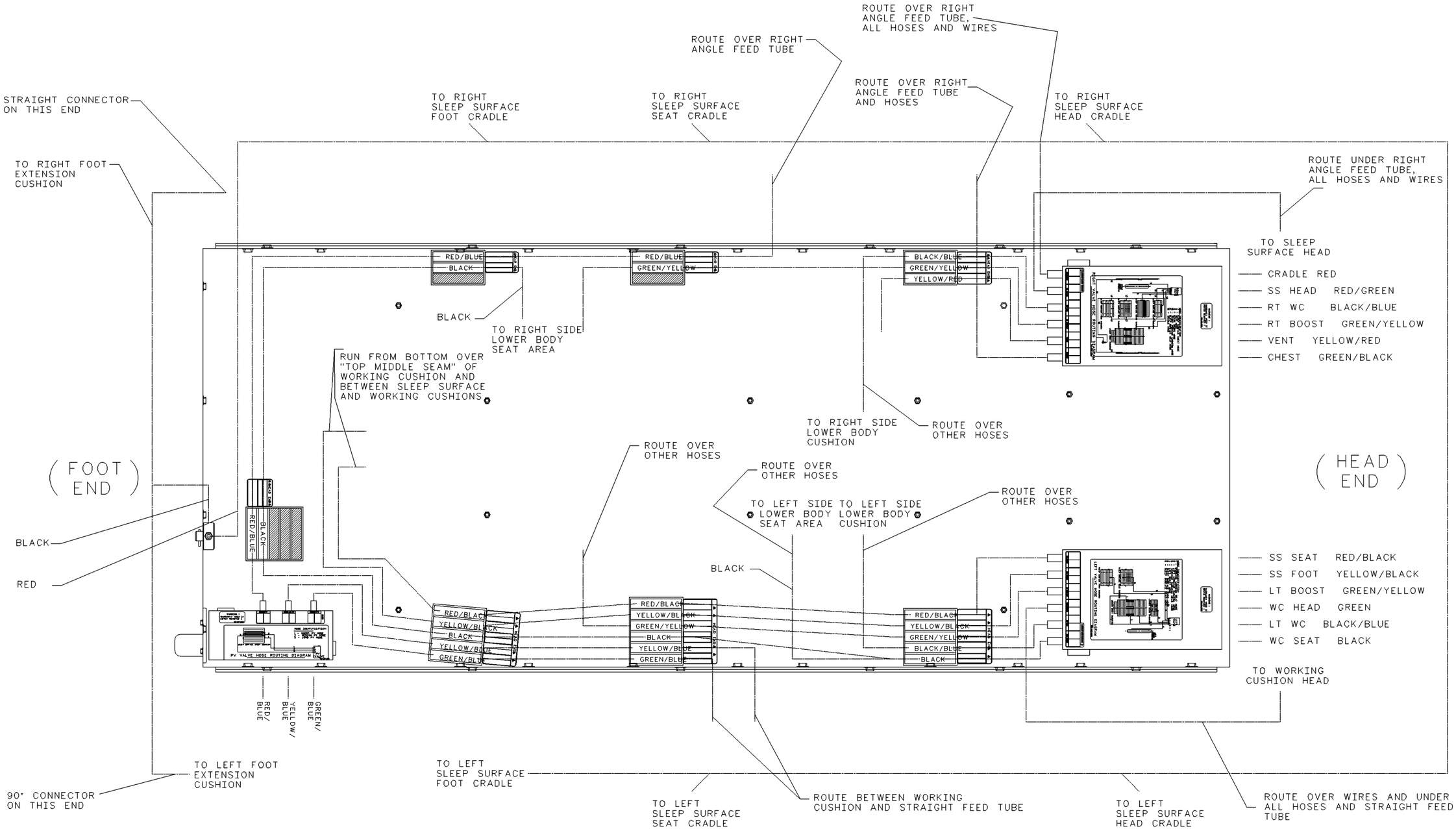
STRAIGHT CONNECTOR ON THIS END
TO RIGHT FOOT EXTENSION CUSHION
TO RIGHT SLEEP SURFACE FOOT CRADLE
TO RIGHT SLEEP SURFACE SEAT CRADLE
ROUTE OVER RIGHT ANGLE FEED TUBE
ROUTE OVER RIGHT ANGLE FEED TUBE, ALL HOSES AND WIRES
ROUTE OVER RIGHT ANGLE FEED TUBE AND HOSES
TO RIGHT SLEEP SURFACE HEAD CRADLE
ROUTE UNDER RIGHT ANGLE FEED TUBE, ALL HOSES AND WIRES
TO SLEEP SURFACE HEAD
CRADLE RED
SS HEAD RED/GREEN
RT WC BLACK/BLUE
RT BOOST GREEN/YELLOW
VENT YELLOW/RED
CHEST GREEN/BLACK
RED/BLUE
BLACK
GREEN/YELLOW
BLACK/BLUE
YELLOW/RED
BLACK
TO RIGHT SIDE LOWER BODY SEAT AREA
RUN FROM BOTTOM OVER "TOP MIDDLE SEAM" OF WORKING CUSHION AND BETWEEN SLEEP SURFACE AND WORKING CUSHIONS
TO RIGHT SIDE LOWER BODY CUSHION
ROUTE OVER OTHER HOSES
(FOOT END)
(HEAD END)
ROUTE OVER OTHER HOSES
ROUTE OVER OTHER HOSES
TO LEFT SIDE LOWER BODY SEAT AREA
TO LEFT SIDE LOWER BODY CUSHION
ROUTE OVER OTHER HOSES
BLACK
RED
SS SEAT RED/BLACK
SS FOOT YELLOW/BLACK
LT BOOST GREEN/YELLOW
WC HEAD GREEN
LT WC BLACK/BLUE
WC SEAT BLACK
RED/BLACK
YELLOW/BLACK
GREEN/YELLOW
BLACK
YELLOW/BLUE
GREEN/BLUE
RED/ BLUE
YELLOW/ BLUE
GREEN/ BLUE
TO WORKING CUSHION HEAD
TO LEFT FOOT EXTENSION CUSHION
90° CONNECTOR ON THIS END
TO LEFT SLEEP SURFACE FOOT CRADLE
TO LEFT SLEEP SURFACE SEAT CRADLE
ROUTE BETWEEN WORKING CUSHION AND STRAIGHT FEED TUBE
TO LEFT SLEEP SURFACE HEAD CRADLE
ROUTE OVER WIRES AND UNDER ALL HOSES AND STRAIGHT FEED TUBE